RAILROAD GAZETTE

SATURDAY, JUNE 19, 1875.

AMERICAN SOCIETY OF CIVIL ENGINEERS.

Seventh Annual Convention.

The Society assembled in the Select Council Chamber, Pittsburgh, at 10 a. m., June 8, and was called to order by First Vice-President W. Milnor Roberts, President Adams not being able to attend. The following imperfect report of the proceedings is condensed from the Pittsburgh newspapers:

TUESDAY'S PROCEEDINGS.

Mr. Roberts on taking the chair made the following address:

ADDRESS OF W. MILNOR ROBERTS.

I learn from Mr. Levorich, our Secretary, that the President of the Society, Col. Adams, has been unavoidably prevented from attending. I know that he was anxious to be here, and fully intended coming, but he has at this time peculiar duties devolved upon him in his official connection with the City of Brooklyn water works, and it became imperatively necessary that he should remain at this time.

You are all aware that engineers in active practice have not always command of their own time. While I regret the absence of our esteemed President, I am rejoiced to see so large an attendance of our members.

In the absence of the President it becomes my duty, as one of the Vice-Presidents, to open the Convention; although I believe it has been customary to have some member, not an officer of the Society, to preside over the general meetings other than the business meetings of the Convention.

Our Secretary, when about to leave New York on the eve of this annual Convention, to be held in Pittsburgh, intimated to me that our excellent President, Col. Adams, would probably be prevented by imperative engagements from attending, and that it might be well for me, as one of the Vice-Presidents, to prepare something in the shape of an address which would be suitable to deliver on our assembling in this place. As there was not sufficient time or opportunity for me to arrange a regular paper or annual *resume* of the yearly proceedings, in case that has not already been done by the President, and, turning to the ever ready recollection of our worthy Secretary for all official information of this character, I thought it would be an easier task—since it would be a labor of love—to sketch out a few remarks which I might hope to render appropriate and not wholly uninteresting, touching the place of an annual meeting this year, namely, the city of Pittsburgh.

I trust that the members present, keeping in mind the limited time at my command, will make due allowance for any lack of order, or want of perspicuity that may appear; turning their attention more critically to the things referred to, rather than to the style in which they are introduced.

It so happens, although I had no special hand in designating the place of our present meeting, or in the admirable arrangements of the local committee here who have planned the programme, that Pittsburgh, the city selected upon this occasion by our Society, has been for years at a time, at several periods of my professional life, my *home;* and that I know its people and its institutions well enough to take the liberty of giving in advance full assurance of a friendly welcome on the part of the citizens, and to guarantee an appreciative reception, and an abundance of objects well calculated to interest the engineering mind as well as to command the respect and admiration of our members as men.

In recalling to my recollection various events and scenes which have tended to endear this old Smoky City to me personally, it just occurs to me that a glance at some of them, since they relate, as it were, to stepping stones in its progress, may not be wholly out of place or uninteresting, especially to those of our members who now visit Pittsburgh for the first time.

I need not go back, with any particularity, to the last century, to old Fort Duquesne, or repeat the story of Braddock's defeat, which unfortunate event occurred about ten miles up the Monongahela river; and I can but glance at the part which the young engineer, George Washington, bore in that memorable battle. More than a hundred years ago, Washington, the Virginia surveyor, pointed to the forks of the Allegheny and the Monongahela, as the site for a future city, at the head of the noble Ohio, as the point of nearest approach between the waters of the Mississippi and the Atlantic Ocean, and referred to a future water communication. If railroads had been invented at that date, he would undoubtedly have had something to say about a railroad.

Hydraulic engineers—canal engineers, in our country, are, as a rule, older, professionally, than railroad engineers; owing to the circumstance that canals were constructed, and many hydraulic contrivances were introduced into the old world, ages before railroads were invented.

The early internal improvements of our country were naturally patterned after such as had preceded them in the Eastern hemisphere and among the olden civilization. One of the first professional civil engineers who figured in the United States was Mr. Weston, who was brought over from England, I think, about the year, 1790, to plan and construct the old Union Canal of Pennsylvania, between the Schuylkill and the Susquehanna rivers—about eighty miles—extending from Reading in Berks county, to Middletown, in Dauphin county. He began the work, and constructed some brick bridges, etc.; but it was afterward suspended for many years. About 1823, Soammi Baldwin, a distinguished New England canal engineer, resumed the work, but in 1824 he gave place to Cawvass White, an eminent engineer from the State of New York, who had been for years actively engaged on the great canal between Albany and Buffalo, "Clinton's ditch," as it was sometimes called, which was begun in 1817 and opened in 1825.

About that time, civil engineering in the United States began to assume definite shape, but only or chiefly in connection with canals, and analogous works. There were bridge builders before that in the United States. Among wooden-bridge builders, Burr and Wernwag had acquired distinction as the constructors of the old bridges over the Delaware at Trenton, the Schuylkill at Philadelphia, and the bridge over the Susquehanna at Harrisburgh. That over the Delaware still stands. A portion of the latter is still in use, although these bridges were built more than sixty years ago. The Schuylkill permanent bridge was destroyed by fire a number of years ago. [It was in 1825, on the Union Canal of Pennsylvania, that the youthful person who now addresses you first drew chainman and rodman's breath as a young engineer. This is mentioned parenthetically—not to be repeated.]

In 1826-27 the first American railroads were laid down, one in Pennsylvania, from Mauch Chunk to the coal mines, nine miles in length; the other in Massachusetts, at the Quincy granite quarries, about four miles long—although it is proper to mention here that *mining railroads* existed prior to that date in the immediate vicinity of Pittsburgh, the planning and construction of which appertained to the working mining engineers of those days.

You all know how railroads starting in that humble way, not quite fifty years ago, have since grown; how they have stretched, spread and ramified through every State and Territory of our expansive and ever expanding Union, until they have come to constitute in the aggregate the most gigantic machinery, as well as the greatest financial investment on the globe.

In the year 1824, William Strickland, architect, of Philadelphia, was sent by twenty-four public spirited citizens of that city to England for the purpose of examining the system then in use (canals), and proposed (railroads), preliminary to entering upon, in the State of Pennsylvania, a grand system of internal improvement. He was accompanied by Samuel H. Kneass, then a young architect and engineer, who made the elaborate drawings for the able report which followed—called "Strickland's Report," and which was published in the fall of 1824, and became the text for the important discussions in the Pennsylvania Legislature, during its session of 1824-25.

Strickland favored the railroad system; but the Legislature, after many deliberations, decided to adopt the canal system; and in 1825, immediately after the adjournment, a number of civil engineers, some having previous canal experience, and others not, were put into the field, to survey and locate the main lines of canal between the Susquehanna River and the Ohio, at Pittsburgh.

Messrs. Holgate and Clarke, Pennsylvania surveyors, had previously devised a scheme for a continuous canal, in 1824, having suggested a tunnel four miles long through the great divide of the Allegheny Mountain. James Clarke, my old and valued friend, who strongly advocated this project, was in consequence thereof ridiculed as a visionary man. Yet there was nothing visionary; he was merely some years in advance of the times. Meanwhile, during the very same year (1825) the grand Erie Canal, 360 miles long, between the Hudson and Lake Erie, was completed and put in operation, confirming the prescience and wisdom of the intelligent few, and astonishing the doubtful many.

Regular railroads were begun in various parts of the country in 1828 and 1829, among them the Baltimore & Ohio, the Albany & Schenectady, the Camden & Amboy, &c. In 1830, dropping for a time my aquatic associations, I became an incipient railroader, and surveyed, laid out and constructed my first railroad in Schuylkill County, Pennsylvania, and about that time railroad engineers began to be brought forth—obedient to the command—increase and multiply.

It was not till the close of 1833 that the Pennsylvania mixed system, as it became, between Philadelphia and Pittsburgh, was completed, although some of the canal divisions were finished somewhat sooner. The railroad from Philadelphia to Columbia, 80 miles, was opened in 1833.

In November, 1833, the first train of cars passed over the Allegheny Portage Railroad, over the Allegheny mountains, 37 miles long, connecting the Juniata and the Western Division State Canals. This was at the time a great road, having ten inclined planes, five on each side of the summit. The gauge was 4 feet 9 inches. The steepest and longest plane had a rise of 10¼ per cent. viz.: nearly six degrees and a length of 3,100 feet. The whole rise overcome on the eastern slope of the mountain was over 1,300 feet, and on the western slope over 1,100 feet. The history of the surveys, location, construction use and final abandonment of this old railroad would make a very interesting chapter—postponed for the present.

This combination of canals and railroad, through Pennsylvania, served the public for about twenty years, and until the Pennsylvania Railroad Company constructed their graded road, without inclined planes, over the mountains from Altoona, making the present continuous railroad, 356 miles long, from Philadelphia to Pittsburgh.

Pittsburgh had begun a more rapid growth from the opening of the canal and Portage Railroad system in 1833-34. Indeed, several years before an impetus had been given by the opening of the Western Division of the canal.

In 1832, after the canal had been finished between Johnstown and Pittsburgh, 104 miles, a disastrous and memorable flood occurred, about the beginning of February, which destroyed the canal and locks, etc., in a number of places, and did an immense amount of injury along the Western rivers, public and private. I was at that time engaged as senior principal assistant engineer on the Allegheny Portage Railroad, of which my esteemed friend Sylvester Welch was the chief. (His brother, Ashbel Welch, you know well as one of our honored members.) I was detailed by Mr. Welch to go forthwith over the entire line of the injured works; to report upon their condition, and to make an estimate of the cost of repairing and rebuilding, rumor having asserted that it would be folly to attempt their resuscitation owing to the enormous cost. This was the occasion of my first professional visit to this city. It is only 43 years ago, yet the Pittsburgh of that time and the Pittsburgh which to-day surrounds us have but a slight resemblance—only such as there may be between childhood and maturity.

The population of Pittsburgh was then about 16,000—of Allegheny Borough about 3,000. There were only a little over 20,000 people in Pittsburgh and vicinity, where there are now more than 200,000. Allegheny City alone now has about four times the population that was congregated at the head of the Ohio in 1832, while the two cities and adjacent boroughs contain more than ten times the number that were here 43 years ago. Pittsburgh, with about two and half paved streets, no public lamps, no police, no gas, no city debt, no grand Municipal Hall; now we see her in the enjoyment of all these modern blessings. Nevertheless, in 1833-34, Pittsburgh built two locomotives for the Allegheny Portage Railroad, which were in profitable use for many years. Mr. Totten, then of the firm of Wade & Totten, a very able Pittsburgh mechanic, took the immediate charge of their construction. I was personally instrumental in obtaining permission from the Chief Engineer to ship a Boston locomotive from Johnstown to Pittsburgh, which served as the pattern for these Pittsburgh locomotives. The fact that locomotives were built in Pittsburgh so many years ago is often forgotten, even by Pittsburgers. The reason is that not another one was built for nearly thirty years, although various efforts were made to establish a locomotive manufactory. For the modern successful introduction of the manufactory, I would refer for information to our friends, Messrs. Porter & Bell.

Major Wade, who was at the head of the extensive foundry and machine shops of those days, and which have for so many years done ordnance work for the United States Government, was a remarkable man, and a very superior mechanical engineer. He was scientific, and he applied his scientific knowledge and great experience, in conjunction with first-class Pittsburgh mechanics, in the most practical and successful manner. Not only Pittsburgh, but the entire country, is indebted to Major Wade and his able coadjutors for many improvements in the construction of the immense guns manufactured at their works, as well as for very useful and valuable experiments and practical success in the mixing and manipulation of the different classes of metal, required to make perfect work for their heavy castings, and heavy machinery of all kinds. The reason Mr. Totten assigned to me for not going on to build more locomotives, was that the work was too trifling compared with the heavy work they were doing.

Pittsburgh was late in having the advantage of first-class railroads at her doors. It is less than a quarter of a century since the Pennsylvania Railroad was running to Pittsburgh. The Pittsburgh, Fort Wayne & Chicago line was started about the same time, and the Allegheny Valley, the Panhandle, the Connellsville and the Wheeling roads not long after. Now, Pittsburgh, as you see, is one of the busiest railroad centers in the country, and the passenger and tonnage business here are enormous.

The position of Pittsburgh, as the center of a great manufacturing district, is peculiarly advantageous. At the head of the most extensive system of river navigation in the world; surrounded with hills abounding in bituminous coal of the finest quality, with the adjacent mountains teeming with iron ore; convenient to the great oil regions, and connected therewith by water as well as by rail; within five hours of the lakes, and within twelve hours of the seaboard; in a salubrious climate, and with an abundance of crude essence of kreosote in her atmosphere, it is obviously the "journal" of the universe, whereas Boston only claims to be the "hub."

It would occupy too much time to give a history of all the numerous engineering works with which Pittsburgh has been associated, some of which, in the march of improvement, and especially in the advancement of the railroad as the predominating element of general transportation, have entirely disappeared from the scene. Of the once famous aqueduct which carried the old State Canal across the Allegheny River, between Allegheny City and Pittsburgh, not a vestige remains. Its demolition has been far more complete than that of the ancient aqueducts of Rome, which still rear their solid time-covered walls conspicuously above the plain. The old canal tunnel, through Grant's Hill, has a history. We once extended the State canal from the Allegheny River to the Monongahela River, and a boat once passed through. This I know, though there may be few others who do. The hill was originally cut down, then an arched canal tunnel was built at the bottom; then it was filled with earth over the tunnel, and street laid out and houses built over it. In 1839, the canal, the tunnel, and the locks descending to the Monongahela were all nicely repaired at the expense of the State; but the merchants of the city never favored this labor-saving arrangement, and they were all allowed to fall into decay. At a later period, only about ten years ago, the Pennsylvania Railroad Company constructed the present tunnel through the same hill as its outlet, through the Panhandle Railroad, to St. Louis and Cincinnati, crossing the Monongahela on the handsome iron bridge which now spans the stream, whose name is redolent of a famous liquid, which, with the prefix *old*, some love to imbibe. * *

Iron, among modern engineers, has taken the place of wood, the material with which we old fogies had to work in the olden time. There were, it is true, a few iron chain or link bridges, fifty years ago; several of which I saw only a few years later than that date, on the Lehigh River, and there was a wire bridge, built by Josiah White, at the falls of Schuylkill, above Philadelphia, more than sixty years ago, over which I recollect being carried. The first modern suspension bridge in this country was, I believe, built over the Schuylkill at Callowhill street, Philadelphia, to take the place of the old permanent bridge, so called, which was a Wernwag wooden, single span of 340 feet 4 inches. This suspension bridge was designed by the late Charles Elliott, assisted by the late John A. Roebling, who was the engineer in the immediate charge and management of the details. Mr. Roebling afterward rebuilt the old wooden aqueduct at Pittsburgh, and introduced, in an ingenious manner, wire suspension cables for its support; but this structure, too, disappeared with the abolishment of the canal. At a still later day, Mr. Roebling built the elegant structure called the Allegheny Bridge, which you will see at the foot of St. Clair street, gracefully spanning the stream between the two cities. In sight, above, is the fine, substantial iron lattice railroad bridge which carries the Fort Wayne Railroad, built by one of our members, Mr. Slataper, and I am very sure that he need not be ashamed of it. At the foot of Smithfield street, over the Monongahela, you will see another suspension bridge, also the work of Mr. Roebling—the oldest iron bridge in this vicinity, which has safely passed a vast amount of very heavy tonnage. There is also the Union Bridge, crossing from the Point to Allegheny, recently finished. It is a handsome wooden structure, well worth seeing. There is to be also a new suspension bridge, from the same point on this side to the south side of the Monongahela, to be elevated 80 feet above the water, work upon which has just begun.

Across the Monongahela you will find passenger inclined planes, worked by steam, which connect the high plateau with the city, nearly five hundred feet below, up and down which thousands of passengers are daily pleasantly and safely conveyed.

Bridge building, locomotive and car building, steamboat building, engines, machinery, pipes for water and gas, etc., are built here. Here you will see first-class modern furnaces, rolling mills, machine shops, and manufactories of all kinds on the largest scale.

The iron ores of Pennsylvania, Missouri, Lake Superior, Lake Champlain and Canada, are here brought together in great quantities, scientifically manipulated, and transformed into every description of iron and steel, and then manufactured into all possible shapes, and finally shipped to every quarter of the Union. The copper ores, from the region around Lake Superior, were at an early day taken in hand by Pittsburgh enterprise, which has in fact, made this city copper headquarters. It is the same with the petroleum trade of Western Pennsylvania, Ohio and Virginia, which largely centers in this city. Strangers may well be surprised at its exports.

About 1838 the city of Pittsburgh embarked in the permanent improvement of the navigation of the Monongahela River, by a system of locks and dams, several of which were completed and opened for use about 1840. This was about the beginning of the coal business, which has since grown to be one of the principal industries of this vicinity. Over sixty millions of bushels of coal are now annually passed through these locks, and shipped down the Ohio River to the numerous cities and towns along the Ohio and Mississippi, even as far as New Orleans. The first lock and dam are within sight, on the Monongahela now.

For many years the general government has been engaged in improving the low water navigation of the Ohio by means of wing dams, dredging, etc., but although the permanent improvement of this important stream has been the subject of engineering discussion for nearly or quite forty years, it was only at the last session of Congress that the first appropriation was made to be applied to the construction of the first lock and dam; the dam to be arranged so as to let down and allow boats, etc., to pass freely during freshets, while the lock may be used during low water, when otherwise boats of any size could not navigate. Should this lock and dam system be successfully introduced on the Ohio River, it will add immensely to the transportation facilities of many States, and save millions of dollars annually to the people of a very large portion of the Union.

Even in thus merely glancing at the engineering objects of interest which appertain to this locality, I find that time is consumed, and I must, therefore, refrain from further draughts upon my memory in this connection. Absence for some years, and the rapid growth of Pittsburgh, not only physically, but intellectually, conspire in reminding me that there are doubtless numerous interresting matters omitted in this hasty survey, to which the attention of our members will be called. The Allegheny observatory, under the auspices of Professor Langley has become an institution of more than national repute, yet I have never had an opportunity of visiting it. The Keystone bridge-building establishment, located here, has, from a comparatively small beginning, attained to colossal dimensions, and so with many other things. Old fogies can hardly keep pace with modern strides.

What I have said may, however, serve to show to our members that at no other point in the United States are there to be seen congregated in a space so compact a greater variety of works especially adapted to gratify intelligent curiosity, and to afford practical instruction to inquiring minds.

The local committee of our members, Messrs. Shinn, Michaels and Metcalf, have, I observe, designated some of the works to

be visited, and I have no doubt that all of us will be both pleased and instructed by their examination. I think I might safely say, for myself and in behalf of the Society, that we come here not to instruct, but to be instructed.

ORGANIZATION.

Before the delivery of the above address, those present were supplied by W. P. Shinn, of the local Committee of Arrangements, with badges as follows: A blue badge to members, a white badge to officers and directors, a pink badge to the local committee, and a green badge to the Society's guests.

Following the reading of the address, Mr. Roberts moved that Mr. W. P. Shinn take the chair. Adopted, and the gentleman took his place and delivered a brief address, wherein he returned thanks for this mark of preference and his appreciation of being called upon to preside over so intelligent a body. The speaker bid all a hearty welcome to Pittsburgh.

An election for Secretary resulted in the choice of Mr. G. Leverich.

MEMBERS PRESENT.

The following members answered to their names: Jas. Archibald, M. S. Belknap, A. P. Boller, A. D. Briggs, C. B. Brush, W. H. Barr, G. Honscaren, M. J. Becker, H. W. Clarke, Thos. C. Clarke, A. Coffin, F. Collingwood, R. S. Cooke, Theo. Cooper, C. W. Copeland, O. E. Cushing, J. P. Davis, F. De Funiadk, J. G. Ellis, Rudolph Fink, C. H. Fisher, J. G. Flagg, Robert Fletcher, C. Fisher, A. Gottlieb, Samuel M. Gray, D. M. Green, George E. Harding, John W. Hill, F. B. Howard, Clemens Herschel, Lewis H. Krupp, Wm. E. Kelly, G. Leverich, Thos. J. Lovett, Wm. Metcalf, C. Macdonald, C. S. Maurice, J. A. Monroe, Marshall Morris, Wm. D. Pickett, S. C. Pierom, P. P. Panier, Levi W. Post, F. C. Prindle, R. S. Read, W. M. Roberts, R. P. Rothwell, J. H. Shedd, F. S. Slataper, W. P. Shinn, Arthur Spielman, J. Dutton Steele, Henry W. Steele, Joseph S. Smith, H. F. Walling, F. C. Wier, Wm. H. Wiley.

DISCUSSIONS ON BRIDGES.

Topic No. 1 (Bridges) was then taken up, and the Secretary proceeded to read the paper by J. B. Eads, of St. Louis, entitled, "Upright Arched Bridges." Discussion then ensued.

Discussion on the topic "Foundations," elicited some interesting remarks from Francis Collingwood, Assistant Engineer of the New York & Brooklyn suspension bridge. This gentleman stated that the settling of piers of this immense structure only amounted to one inch and was uniform. The pressure on each square foot of timber substructure, below the masonry, was eight tons, while the pressure of the timber upon the bed of the river was about four tons.

The "Erection of Structures," a paper by Theodore Cooper, Engineer of the Illinois & St. Louis Bridge and Tunnel Company, St. Louis, was then taken up for discussion.

Following this, Capt. J. B. Eads' report on the "Means of Averting Bridge Accidents," was taken up.

In commenting thereon, Vice-President Theodore G. Ellis, of Hartford, Conn., spoke of the varying strains brought to bear upon bridges and the combination of cast and wrought iron for compression loads, and advocated the building of bridges calculated in all cases to bear a working load of fifty pounds per square foot. He spoke of a small bridge in Hartford where a load of forty tons had been taken over without damaging the structure. One great fault of bridges these days was the combination of cast and wrought iron in the compressive members. This, he thought, was a very important point. This topic was also discussed by Alfred P. Boller, of New York.

Mr. J. D. Steele, of Paterson, didn't see why the established rules for estimating the nature of bridges, and their strength, should be abandoned for newer methods, and wanted the standard of one ton per lineal foot always adhered to. Mr. Wm. Metcalf, of the Crescent Steel Works, Pittsburgh, said that during the war guns were frequently sent from the city, of 116,000 pounds weight, and such guns had to pass over all the railroad bridges on the route. Many of these bridges had to be strengthened temporarily. He did not think any established rule should be adhered to to govern all bridges.

Mr. J. H. Shedd, of Providence, R. I., and Mr. Clemens Herschel, of Boston, Mass., took part, and the latter advocated the making of vigorous tests of all material, saying that this would insure good material.

Mr. Thomas C. Clarke, of the firm of Clarke, Reeves & Co., of Philadelphia, spoke briefly in favor of a change in the standard of tests, but as those who ought to know radically differed as to the remedy, he proposed nothing.

Mr. Theo. Cooper desired to know if it was proposed to have the same rules for bridge loads hold good in the case of narrow-gauge roads, whether the strain was much less in a full-sized gauge, and if a flexible rule which would cover all cases were practicable. Mr. Charles McDonald, of New York, and Mr. Ellis, of St. Louis, replied briefly.

At the conclusion of the latter gentleman's remarks, the Chair stated that action on the reports alluded to would be taken in the evening. The speaker also asked that members would please notify Mr. Metcalf as to their attendance at the annual dinner, at the Monongahela House, Wednesday evening.

OTHER PAPERS.

Steam Engines and Furnaces was the next topic down for discussion, and Mr. Graham P. Low's (Boston) report on "Comparative Examination of the principal Pumping Engines in Use," was made the subject of a few remarks. Mr. David M. Greene, of Albany, New York, stated in brief that it was impossible to compute in advance, with accuracy, the workings of an engine.

The subject of "Compound Engines" and the paper thereon, by C. E. Emery, of New York, was passed, also the subject of "Wet Fuel." "Rails and Railroads" laid over till Thursday.

RAILROAD SIGNALS.

"Railway Signals," a paper by J. D. Steele was discussed.

Mr. C. H. Fisher, Chief Engineer of the New York Central & Hudson River Railroad, thought that there was no subject for discussion which would elicit such little gratitude as that of Railway Signals. He was discouraged from the reception which a committee appointed to consider a special topic recently had received. Mr. Steele spoke next regarding this topic. He attributed the occurrence of accidents in nine cases out of ten to faulty signals.

The Chair called attention of the Society to that simple signal, the whistle, and alluded to the Norwalk bridge accident some years ago, The testimony hinged on the fact of the signal by the engineer and witnesses were conflicting as to whether one or two sounds were given. Two blasts had evidently been mistaken in this case for one, by the brakeman, and the speaker regretted that a signal existed, where it was likely that just when the danger was the greatest such a mistake could take place. It was supposed that the rapidity with which the Norwalk engineer sounded two blasts (danger) had caused the sound waves to follow each other so closely as to sound like one blast (safety), and hence cause the great disaster and loss of life which ensued.

RAPID TRANSIT.

On this subject a paper by Mr. Richard H. Buel, of New York, was read, criticising severely the report of the Committee.

To this Mr. Collingwood took exceptions. The reason why rapid transit was not a success was that the plans proposed were too expensive. If it can be shown to pay capitalists will invest. The Committee felt the impropriety of reporting in favor of any special plan.

Mr. Fisher thought that the resolution under which the Committee acted was unfortunately drawn. He thought the Committee was wise in being cautious; it was indeed a very valuable report. He expected to find a general expression of views on it at this meeting. He hoped it would be laid over till Thursday for further consideration.

The Secretary stated that Mr. Chanute, Chairman of the Committee on Rapid Transit, had labored assiduously at the report, and in consequence was now in search of health in Europe.

Mr. Dutton Steele alluded to the visionary schemes discussed in connection with rapid transit, and he regarded the report as one of the most satisfactory and valuable ever presented to the Society. That each and every one of the supporters of the visionary plans, had begged the committee's endorsement, and had been refused. Also, that the labor of the committee had been to sift out the impracticable and retain but a few of the many plans offered. Mr. Robert L. Cooke, Engineer of the Public Parks, New York, spoke briefly, and Mr. Macdonald considered that this subject more properly belonged to the business session that evening. Mr. Fisher's suggestion was then adopted and the matter was laid over.

The Chair called the attention of the members to the programme for the afternoon, and gave some information in reference to reaching the points named, particular attention being called to the diamond-toothed saw and the Allegheny pumping engines. The afternoon was devoted to short excursions of the members in detachments, to such points of interest, easily accessible, as they severally selected, among which were Glass Works, Spike Works, Tack Works, American Iron Works, and Open Hearth Steel Furnace on South Side; Diamond-Toothed Stone Saw (at Fort Pitt Works), Crucible Steel Works, and Allegheny Pumping Engine.

After further informal discussion regarding the coming excursions, the session adjourned.

EVENING SESSION.

The evening session was devoted chiefly to the discussion of the policy of the Society with regard to the appointment of committees to report on special subjects, a discussion occasioned by the controversy called out by the Report on Rapid Transit.

WEDNESDAY

was devoted to visits to manufactories and other works of interest, as guests of the railroad companies and the manufacturers of Pittsburgh. A special train left the Union Depot on the Allegheny Valley Railroad at 8:10 a. m., stopping at the Union Iron Mills, at Carnegie, Bro. & Co.'s beam mill, at Graff, Bennett & Co.'s mill, at Dank's puddling machines, at the Crescent Steel Works of Miller, Barr & Parkin, and the Keystone Bridge Works, and at the Lucy Furnace, getting back to the Union Depot at noon. Lunch was served on the train.

The train then left at noon by the Pennsylvania Railroad, stopped at the new Edgar Thomson Bessemer Steel Works, at Carnegie & Co.'s coke works, at the McKeesport Tube Works, at Le Wees, Woods & Co.'s Russia iron mill, at the Blair Iron and Steel Works (iron sponge and open hearth process), and returned to the Pan Handle depot in Pittsburgh at 6 p. m.

The annual dinner was had at the Monongahela House at 8 p. m. of Wednesday.

THURSDAY'S SESSION.

Mr. W. P. Shinn, Chairman, called the Convention to order at 10 a. m., and the discussion of the Rapid Transit question, begun on Tuesday, was resumed.

RAPID TRANSIT.

In response to a call, William H. Searles, Consulting Engineer, of New York, spoke upon the subject. After referring to the frequency of stops of trains needed in large cities, and the consequent irregularity in the speed of trains, he stated that the average velocity was short of the maximum velocity by 2¼ per cent., which could be avoided by dispensing with the stoppings and making the velocity the same. The speaker favored the "endless-train" plan for rapid transit. As to the control of the stationary engines over the endless trains, Mr. Searles thought that it would be fully as great as that of the locomotive over an ordinary train. Dangers from accidents would be quite remote, as a system of telegraphy could be used, whereby any passenger could, by touching knobs or buttons placed at frequent intervals along the line, have all the engines stopped instantly, and a system of electric brakes could be similarly available. A commendable feature of the endless-train plan is the ease with which passengers can get on or off trains in motion by means of the auxiliary train.

Mr. J. Dutton Steele, of Pottstown, Pa., thought the elevated roadway was the most feasible, especially for New York City. He recommended a uniform gauge of 4 ft. 8½ in., as such a gauge would be found necessary in the event of interchange of cars.

Mr. Charles E. Emery, of New York, remarked that he did not see why, in the "endless" system, the entire track should be covered with moving links in the shape of cars, but thought that a light locomotive might be employed to run at high speed and with a line set the different cars in motion. This terminated the discussion on rapid transit.

RAILS.

The report of the Committee on the "Form, Weight, Manufacture and Life of Iron Rails," was the next topic taken up. Mr. Alex. L. Holley, of Brooklyn, alluded to the best size of flanges for rails, stating that three-sixteenths of an inch was considered the best proportion, and the leading manufacturers considered that a proportion of from thirty-five to forty one-hundredths of carbon was about the most advisable in steel rails. He discussed the question of the necessity of stronger flanges than those recommended by the committee, and thought that experiments should be made to determine the matter.

Mr. William Metcalf, of the Crescent Steel Works, Pittsburgh, thought that toughness and softness, so far as rail flanges are concerned, do not necessarily go together.

The Secretary then read a letter from Mr. Walton W. Evans, of New York, stating that the writer sent to the Convention the accompanying samples cut directly from the first "flat foot" (T) rail ever laid down. This rail was made in 1831, and laid down in 1832. Its form was the invention of Mr. R. L. Stevens, of New Jersey. In view of the fact (stated the writer) that every other country but England had adopted the "flat-footed" rail, it was proper that the credit should be given to an American for inventing this form.

CHEAP TRANSPORTATION.

Chairman Shinn having been set down to reply to the topic of "Cheap Freight Transportation," resigned the chair in favor of Mr. William Metcalf and began his remarks, after a letter on the subject had been read from Wilson Crosby, of Brooklyn, New York.

Mr. Shinn held that this question possessed an interest entirely outside of its scientific bearings; that it was a question, frequently, of "railroad wars," wars which seldom resulted in benefits either to producers or consumers. The speaker was in favor of uniform rates, rates that would insure the transportation of freight in a prompt and satisfactory manner to all concerned. Thecereal product of the West could be transported at the rate of seven mills per ton per mile, and the speaker held that his statement to this effect, some time ago, at a former convention, had been misconstrued into meaning all classes of freight. Other duties prevented the speaker from giving the subject the attention it demanded, but he hoped that he could prove his former statement. Mr. Shinn then quoted figures from the reports of the Pittsburgh, Cincinnati & St. Louis Railway, the Lake Shore & Michigan Southern, and the Pennsylvania Railroad, showing that (in the first two instances) the cost to the road on all classes of freight was nine mills per ton per mile, and in the case of the Pennsylvania Railroad was just about seven mills. And that, in the case of cereals, which all railway men know can be handled more cheaply, rates would be less than seven mills, and that these figures proved the speaker's assertions.

Watered stocks had been frequently set forth in the newspapers as the cause of high transportation, but figures disprove this assumption. He remarked that 1½ mills per ton per mile would pay 7 per cent. on all the capital invested. The speaker next referred to the Grangers, and thought the Granger ides had fizzled, as somebody had to pay for transportation, and railroads could not carry freight at a loss. One good effect of the movement was to secure more economy and back loads. The result has been that on some roads the car mileage has been very materially reduced. Every railroad can, by encouraging back traffic at low rates, reduce the average cost per mile of transporting freight. The result of all this discussion is that the public will get their transportation at lower rates, and there is a tendency toward a minimum. [Applause.]

Mr. W. Milnor Roberts next spoke on the subject as follows: "One fact that I may mention is that coal has been carried on barges towed by a steamer, from Pittsburgh to Evansville, 783 miles, for one-twenty-fourth of a cent per ton per mile. This, however, included a moderate profit; but it did not include the cost of returning the barges up stream, which might be one-fourth as much for empty barges employed for the coal tonnage, as the cost of taking the loaded boats down.

"I will mention another fact, that granite intended for the St. Louis, which had been brought by vessels from New England to New Orleans, was conveyed in barges from New Orleans to St. Louis, nearly 1,300 miles up steam, for eight dollars per ton, which, however, included a large profit to the party doing the business. Now on a railroad half the length, or say 650 miles through the same region, and putting the cost of transportation at eight mills per ton per mile, including profits, it would be nearly double of the river cost. The river can transport at lower rates than these just named.

Coal is carried from Pittsburgh to New Orleans, nearly 2,000 miles, for $2.80 per ton, which is 1 4-10 mills per ton per mile, including in this charge the cost of returning the empty barges and the profit to the owners of the steamers and barges.

Mr. Collingwood spoke of carrying cotton. If it could be compressed so that eleven bales could be loaded into one car, why ship only five? The high charges for handling blocks of stone and iron bars he also discussed. Terminal charges for handling vary from three cents to a dollar per ton. There is generally much needless handling, forming an important part of the cost of transportation.

Mr. Shinn thought that about five mills per ton per mile was as low as the railroads could carry freight profitably.

Mr. Clemens Herschel spoke in favor of short 4-wheeled cars, which Mr. Dutton Steele also approved as having less dead weight than ordinary American cars.

Mr. Holley mentioned their invariable use in England, where also few cars are closed, but the freight is usually covered by tarpaulins.

EUROPEAN RAILROADS.

The paper of W. H. White, printed in the June *Transactions*, was then discussed.

Mr. Felician W. Slataper remarked that the great care displayed in the laying out of European roads claimed attention and imitation by an engineer. Their freight cars were also built with extraordinary care and not subjected to the loads that are imposed in this country. Couplings were devised to do away with the danger attendant upon this part of our cars. "European locomotives, however," said Mr. Slataper, "bear no comparison to those built in America." This statement was received with applause by those present. As to roadway, the stability with which every part of European roads are built, Mr. Slataper thought that they were considerably ahead of us.

The Chair (Shinn), apropos of the question of locomotives, stated that the Chairman of the Board of Directors of the Great Western road of Canada, in his report to the stockholders, stated that two American engines proved themselves equal, in all respects, to three British engines.

Mr. Milnor Roberts gave his experience in South America in this connection. He stated that on a road running out from Rio Janeiro, American and British locomotives had come into competition, when it was discovered that the latter would not take the curves, owing to their being coupled too long, and in other ways showed themselves inferior to the Yankee engines. The question of freight cars had not come up in the management of this road.

The Chair then referred to the question of springs under cars as a prevention of wear in the track. An experiment with a lever—inserted under the rail, and provided with a recording pencil—showed that when a twenty-ton sleeping car passed over the rail, there was less deflection than in the case of an eight-ton freight car, a difference wholly attributable to the superior springs of the former.

BRIDGE ACCIDENTS.

In the afternoon the discussion of this subject was resumed.

Mr. Clemens Herschel did not think all the difficulties could be cured by legislation. He was very desirous that some end might be attained in this behalf. He would yield to no one in his enmity to what are called "tin-pan" engineers. The committee should recommend only complete bridges. Legislation could, of course, in some measure improve the condition of affairs. Especially there should be required full tests of all bridges before they are put to public use.

Mr. McDonald thought the Society ought to come to some conclusion on this subject. Their opinion would have a moral weight, and they could then secure intelligent legislation on the subject.

Mr. A. D. Briggs, of the Massachusetts Railroad Commission, examined a bridge last spring calculated to sustain 20 tons and covered with 70 tons of snow and ice. He thought that bridge building seemed to be drifting into an inexact science, if it was to be judged by the correspondence of some members of the Society. There was a difference of 30 per cent. in the strengths of a specified structure imputed to it by different members of the Society. If they asked legislation, some one might ask them how they reached their conclusions.

Mr. C. Shaler Smith thought there was need of a standard, to be enforced by law, limiting the strains per square inch of material.

Secretary Leverich read the report on a "Testing Laboratory."

Mr. A. L. Holley, of the Government Commission for Testing American Iron and Steel, gave an account of the purposes of the Commission. They had determined to combine the plans of two bidders for a testing machine of 800,000 lbs. capacity.

Mr. Metcalf, of the Crescent Steel Works, read a paper on the advantages of steel over iron for construction. He believed that both cast and wrought iron would eventually be superseded by steel.

RIVER MOUTHS.

The next topic was "River Mouths," and on the general subject a paper entitled "Delta of the Mississippi considered in reference to an open river mouth," by General Barnard, was discussed.

Mr. Milnor Roberts read a paper in consideration of General Barnard's views. In it he referred to the action of the Government in appointing a commission for the improvement of the mouth of the Mississippi, and the final adoption of the jetty system. The paper continues: "Congress at its last session entered into an agreement with Captain

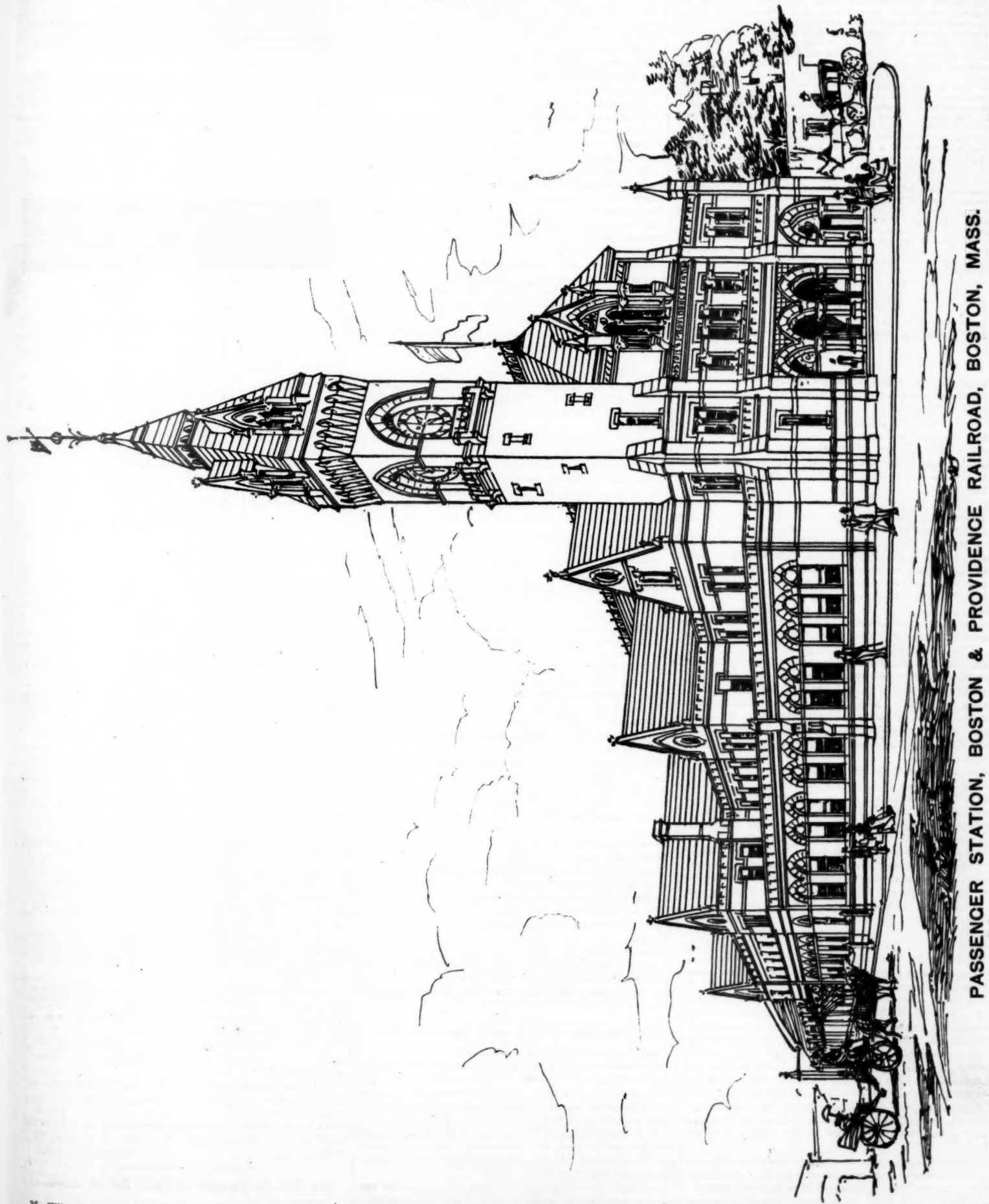
Eads, a member of our society, to construct the works. I will take a moment to say that, according to my judgment, this undertaking is the greatest work of river engineering that has ever been adopted, and I feel confident of Captain Eads' success if he brings to bear all the resources of his engineering skill." Respecting the formation of the Mississippi delta, Mr. Roberts stated that it was formed by deposits of sediment by the river itself and the jetty system is the best that can be made for its improvement. Mr. Roberts then gave the result of his studies in regard to different principal rivers of this and Eastern hemispheres.

Mr. Ellis also spoke regarding the improvement of the Mississippi's mouth. The topic of rain fall and water supply was then considered. A paper was read by Mr. Shedd, followed by a speech by Gen. Ellis, in which the gentleman explained a method of his own for the accurate measuring of the currents of rivers and streams. He was followed by Mr. J. J. R. Croes, of New York, on the same subject. Afterward papers on masonry were read by Mr. Shedd and others, and the Convention adjourned until evening, when a purely business session was held.

On Friday those who chose made an excursion to the Butler oil region, and on Saturday one to Chautauqua Lake.

Boston & Providence Passenger Station.

The new passenger station of the Boston & Providence Railroad in Boston, perhaps the handsomest structure of the kind in this country, is illustrated by the full-page engraving. The following description of it is the one given in the Report of the Boston "Inspector of Buildings," Mr. Oliver L. Shaw, for the year 1874. We have previously given a longer description of it, taken from a Boston newspaper:



PASSENGER STATION, BOSTON & PROVIDENCE RAILROAD, BOSTON, MASS.

Situated on the triangular lot bounded by Park square, Columbus avenue and Providence street, Ward 9.

The building is Gothic in design, and is built of brick laid in black mortar, and with Nova Scotia stone trimmings.

The head house is 200 feet long and 151 feet wide. The train-house is 600 feet long, 128 feet wide and 65 feet high.

The main entrance to the building is on Columbus avenue, through a vestibule 25×32 feet, paved with tiles, and the ceiling finished with hard pine. On the left of the main entrance, on Park square, is a brick tower 150 feet high, containing an illuminated clock with four faces, each 10 feet in diameter. The vestibule leads into a general waiting-hall 170 feet long, 44 feet wide and 80 feet high, extending up above the rest of the building so as to admit light through clear story windows. Additional light is also obtained through sky-lights in the roof. This hall, as well as the remainder of the first story, is paved with black, white and red tiles, and is heated by means of three stacks of marble-topped steam radiators. Around this hall, and on a level with the second story, runs a gallery, connecting the corporation offices in the second story, supported by wooden columns and brackets: between these columns are pointed arches, finished in ash, and glazed with plate glass, dividing the hall from the waiting-rooms on the sides and at the end opposite the entrance from the train-house. The main hall is covered by a roof supported by hard-pine trusses, and sheathed with pine varnished and decorated. On the left of the hall is the smoking-room, 44×27 feet, gentlemen's waiting-room, 50×40, ticket office, and ladies' room, 50×62. The parcel-room is between the waiting-rooms and behind the ticket office. Connected with the ladies' waiting-room is a dressing-room, 15×24 feet, and water-closet.

On the right of the hall is the main staircase to the corporation offices in the second story (which are also connected with Park square by means of a private vestibule), gentlemen's dressing-room 15 feet square, gentlemen's water-closet,

34×13 feet, telegraph office, periodical stand, barber shop, restaurant 50×30, private dining-room and serving-room. All of these rooms are 20 feet high, and finished in ash. The windows are glazed with plate glass and leaded glass above the springing of the arch. On the walls of the ladies' room are painted maps of the road and its connections. Next to the ladies' room is a corridor leading to the Columbus avenue entrance and which connects with the outward baggage-room.

In front of the building, in the second story, is the Superintendent's general office, Superintendent's private office, and President's private office. On the left of the building is the President's and directors' room, Treasurer's general and private office, ticket agent's office, and conductors' room, and connected with these rooms are the necessary dressing-rooms. On the right of the building is a room for the storage of supplies, travellers' reading-room, billiard-room, 30×50 feet, spare office, kitchen and bakery, the latter being over the restaurant and accessible therefrom by a private staircase. In the third story, over the front office, are sleeping-rooms and bath-rooms for the President, Superintendent and Treasurer. The entire building is finished in ash; the walls and ceiling painted and decorated with oil colors, and is heated by steam furnished by four large boilers in the basement. The train-house is entered from the main hall on the first story through three arched doorways. On the right of the entrance is the depot-master's room, and a staircase leading to the gallery of the head house. On the left is the outward baggage-room, which connects with the Columbus avenue carriage entrance. About half way down the length of the train house, and outside the building, is a room for the storage of inward baggage and waiting-room for hackmen. The roof, which covers five tracks, is supported by arched iron trusses 24 feet on centres and 125 feet span. Light is furnished through large windows in the sides and glass in the roof. The trains enter through arches in the end of the train-house, the largest of which is 68 feet span. The architects were Messrs. Peabody & Stearns; the mason, John W. Leighton, and the carpenters, Morton & Chesley.

Contributions.

The Pacasmayo, Guadalupe & Magdalena Railroad of Peru.

LIMA, April, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Through the courtesy of Jacob Backus, Esq., Superintendent, and Thos. Pallant, Esq., Resident Engineer, I am in possession of many items concerning this road, which is now finished by Henry Meiggs, Esq., Contractor, and about to be delivered to the government of Peru, for whose account it was built. From the data I have I select the following, with the hope that they may be of interest in a general way to railroad men.

The main line, 4 ft. 8½ in. gauge, extends from Pacasmayo to La Vina—74 miles—ten miles from Pacasmayo a branch 16 miles long to Guadalupe leaves the main line, crossing the Rio Jequetepeque on an iron bridge of the design of Edward Woods, Esq., London. The bridge is a continuous lattice—in bays of 105 ft.—having a total length of 640 ft. Guadulupe is a town of 5,000 inhabitants, surrounded mostly by coffee plantations, though at present many lands heretofore occupied in coffee and rice are being planted in sugar, the principal of which, heretofore belonging to Henry Meiggs, Esq., "Lurifico," is being fitted out with sugar machinery by a Philadelphia firm, of the best modern construction, and when completed will be capable of making daily 10 tons of refined sugar.

The main line follows the course of the River Jequetepeque. Up to 25 miles from Pacasmayo the curves do not exceed six degrees, nor do grades exceed 2 per cent.; but here grades of 3 and 4 per cent. are necessary, and curves of 400 ft. radius, with heavy work. The road crosses the river three times, with bridges of 180 ft. span—two English bridges and one American (Baltimore Bridge Co.) ordered to replace one of the English bridges that failed.

There are several smaller bridges of 50 to 80 feet spans, crossing the ravines emptying into the river.

At 64 miles from the sea and an elevation of 2,760 feet, the station of Chilete is reached. In this vicinity are very rich and extensive silver mines, formerly worked, but for some time past abandoned. A company of $2,000,000 capital has been lately formed to re-open them, and with the facilities that the railroad can now give are fitting out with modern mining machinery. Some considerable work must be done in putting the mines in workable shape, in consequence of their having been neglected, before the company can get at much new ore.

For a considerable distance the road follows the river bed, which is very wide; but on account of the heavy freshets in the rainy season of the mountains the whole of the slope of the embankment has to be heavily rip-rapped—this method being much cheaper than to excavate the road-bed out of the mountain sides.

At 74 miles, altitude 3,470 feet, the station of La Vina is reached, where the road terminates. The terminus as well as the beginning, Pacasmayo, is well supplied with all necessary appurtenances. Passenger station, round house, turn-tables, car and freight sheds, etc. Water tanks, turn tables and all buildings except the passenger station are of iron. The passenger stations and cars follow the European plan—very suitable to this country—of providing separate apartments for first and second class passengers, and providing living apartments in the station building for the station master, or "chief of station," as he is here called; also for the employees of the station.

The road with all it appointments is of first-class workmanship—very creditable to those intrusted with its construction. Rail, 63 lbs. to the yard; fish-plate suspension joints. Engines, Rogers and Danforth Works, averaging 45 tons each, drawing 50 tons at 10 miles per hour up a grade of 4 per cent., or 211 feet to the mile. Cars, by Gilbert, Bush & Co., Troy, N. Y.

The line was originally intended to go to Cajamarca, distant in an air line from the terminus about 20 miles, crossing the summit of the Cordilleras; but the survey showed the summit to be 11,800 feet in altitude, and to reach Cajamarca (altitude, 8,700 feet) a development of line 50 miles in length would be necessary, with 4 per cent. grades, a tunnel 3¼ miles long at 9,650 altitude, some long and high bridges, and very heavy grading. The project has, for the present, been abandoned.

PACASMAYO MOLE, OR PIER.

Connected with the railroad at the seaport, Pacasmayo, is an iron mole, 2,535 feet long, 35 feet wide—except the "head," which makes up 330 feet of the length of the mole and is 105 feet wide. This is now about finished, and as it is of a somewhat standard pattern of the iron moles built on the coast, I will give a few details as furnished by Mr. Rose, the engineer in charge of it.

It is of the Mitchell system of screw piles. The piles are solid wrought iron, 5 in. in diameter, three to each girder, or 16 ft. 6 in. apart from center to center. The center one is vertical, the two outer ones are on a batter outwards at the foot of 1 in 6. Each column is united to its place on the girder by a a cast-iron cap, which also serves to attach the diagonal cross-bracing between head and foot of columns. The screw at the foot of each column is of cast iron, 24 in. in diameter in central columns and 18 in. in outer columns.

The cross girders, each resting on three columns, are 15 feet apart from center to center, except in the "head," where they consist of 21 rows 16 ft. 6 in. apart, resting on eight rows of columns, each row 15 feet apart.

The first 56 bays or spans have diagonal cross-bracing of 1⅛-in. round iron, with upset ends and 2-in. screws at ends, where a flat iron ring of 5 × 1 in. cross section, octagonal shaped, surrounds the point of intersection and carries the nuts for these screws, by which the stays are tightened, between the pier on sea bottom, the octagonal ring, and the pile cap before mentioned.

From the 56th bay to end, at 13 ft. 3 in. below eye of pile cap, comes a cross bar composed of two 6 × 2 × ⅛ in. channel bars, placed back to back, with distance studs between them, and having the same set of bracing under water as above described, for the last 10 bays from the end. The 80 bays preceding have only a single stay (below the cross-bars, of channel iron) from the center column down to the feet of the outer columns.

At three places in the 35-feet width, and for four bays at each place, occur the same kind of bracing in the direction of the length of the pier—these places being at about one-fourth, one-half and three-fourths of the length of the pier from the shore.

In the "head" all the columns are vertical and the bracing above and under water is of 1⅛-in. round iron, and runs fore and aft as well as transversely.

The cross main girders are of ⅛-in. plate and 3½-in. angle iron, 20 in. in depth, and 17 ft. 1 in. over ends of each half, making an extreme width of 34 ft. 2 in. over all in iron work, with a projection of 4 in. in convexity of each 14 × 14 in. moulding timber, (hereafter mentioned), making total width of deck 34 ft. 10 in. (say 35 feet).

The longitudinal rail bearing girders are of ⅛-in. plate and 3 × 3 × ⅛-in. angle irons, 14 ft. 0⅛ in. long, 15 in. deep, and are riveted to plates of cross main girders by knee-plates or flanges, which at every sixth bay or 90 feet are fitted with bolts and oval holes, in place of rivets on the flange of knee-plates, to allow for expansion and contraction.

In the "head" the main girders are as above described, and the smaller ones like the rail girders are placed five feet apart, spanning the 16 ft. 6 in. centers.

Depth of water at "head," 24 feet; height of deck above high water, 8 feet; rise and fall of tide, 5 feet.

In the 35-feet width are two lines of rails 16 ft. 6 in. apart from center to center, carried on four longitudinal girders above described; at shore end and near the "head" are crossings from one track to the other.

From abutment to "head" there is a hand rail on both sides of cast-iron posts and 1-in. diameter gas tubing. The deck is of 6×4-in. pitch pine spars, with 1 in. spaces, and laid at right angles to direction of mole. Along the ends of main cross girders run, on either side, a rounded moulding timber of 14×14 in., and under each rail are stringers of 7×14 in., and up the center one of 12×10 in., all of pitch pine, and upon which are laid rails, decking, and hand rails.

A portable steam engine with suitable gearing was used for screwing the piles into the sea bottom and cutting them off at the proper height after they were firmly fastened. As fast as those for a span were thus finished, the girders and decking could be put on and the engine and apparatus moved along for the next.

From the 20th to the 100th bay the sea bottom was a species of concrete so hard that the screw could not take hold. For these spans a steel drill had to be used and followed by the piles or columns fitted with steel cutters, and with these the deepest hole made was three feet.

The "Abominable" in Materials for Construction.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I see some one is after the unfortunate but "abominable" cross-head again. I think that two things may fairly be said in this connection, one being this, that the cast-iron crosshead need no more be spoken of in this particular way than the axle box, or the dome head, or the piston, for these all may be made of other and lighter material, giving the same margin of strength; and the other, that our railroad men could usefully turn a more careful glance at the newer materials of construction that are offered for use.

If phosphor bronze be dismissed from the list for the moment, on account of its frightful price, it is still safe to name the steel that is now offered to be cast to pattern in any form, and to any really needed limit of strength. The old and simple malleable iron casting is all too little used in our locomotive work, and it might be put into numerous little fixtures that don't cost much, it is true, in forged iron, but yet every cent tells in these days, and even though there are not "millions in it," yet there may be enough in the saving due to a year's use of some classes of malleable fittings to pay an additional one per cent. on somebody's single share.

Let us then endeavor fairly to improve our materials of construction, and to get the best for the place; but surely a thing need not be hooted at, even if it be of universal use, so long as it fulfils its purpose so well, and so long, too, as our best men don't clearly see their way to use anything, which, all things considered, is really better.

PITTSBURGH.

Table for Replacing Lost Center Stakes on Curves.

ROBINSON, Ill., April 22, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE:

During the construction of a railroad, it frequently happens that nearly all the center stakes on a curve, even on any light work, get knocked out or misplaced. If there are two stations left undisturbed, with several intervening ones knocked out, these intervening stations may be replaced by laying off their ordinates from the chord that lies between the two stations. These ordinates can be easily calculated by the aid of the following table, which I have constructed for that purpose. Though not mathematically correct, yet it is accurate enough for all practical purposes, where the central angle subtended by the chord from which the ordinates are to be measured does not exceed 18° or 20°. The sub-chords must all be of the same length.

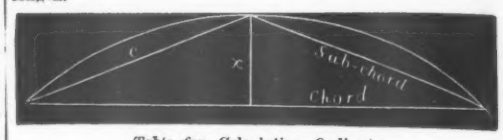


Table for Calculating Ordinates.

No. of Sub-Chords.	No. of Ordinates.									
2		x								
3	2	2								
4	3	4	3							
5	4	6	6	4						
6	5	8	9	8	5					
7	6	10	12	12	10	6				
8	7	12	15	16	15	12	7			
9	8	14	18	20	20	18	14	8		
10	9	16	21	24	25	24	21	16	9	
11	10	18	24	28	30	30	28	24	18	10
12	11	20	27	32	35	36	35	32	27	20
13	12	22	30	36	40	42	42	40	36	30
14	13	24	33	40	45	48	49	48	45	40
15	14	26	36	44	50	54	56	56	54	50
16	15	28	39	48	55	60	63	64	63	60
17	16	30	42	52	60	66	70	72	72	70

EXPLANATION OF TABLE.—The numbers at the head of columns stand for the number of ordinates. It will be observed that they are the increment of the column over which they stand. The numbers in the left-hand column stand for the number of sub-chords for which ordinates are to be calculated.* A line drawn diagonally across the table from 1 to 72 is the dividing line, and crosses the numbers used in finding the middle ordinate. These numbers are the squares of the numbers standing at the head of the column. All the numbers to the right of this line are superfluous, as they are a repetition of those on the left.

To use this table, first, find the middle ordinate for two sub-chords; let X = the ordinate and c the length of the sub-chord.

Then $x = c \times$ sin. of angle of deflection for that chord. x will be a constant for any given curve, with sub-chords of a given length. *Example.*—It is required to find the third ordinate of a 1° curve of eight sub-chords, the sub-chords = 100 feet; first find the value of x by formula, which will be $x = 0.873$; then look in the column under 3, and on line with 8 chords the number 15 will be found; this multiplied by 0.873 will give 13.095, the required ordinate. If the middle ordinate is required, look in the column under 4 and on line with 8; the number 16 will be found. This number, it will be observed, is crossed by the dividing line; $0.873 \times 16 = 13.963$; the true value of this ordinate is 13.957.

The middle ordinate for a 1° curve of 16 chords of 100 feet each, calculated by table, is 55.852 feet; the true value is 55.758. The middle ordinate of a 6° curve of 4 chords, 100 feet each, as per table, = 20.936; the true value is 20.874.

The smaller the central angle, the more nearly will the estimate be correct; the side ordinates are still closer approximates than the middle.

I have used this method in giving centers for pile bridges on curves, in which case each span represents a sub-chord.

When the sub-chords = 100 feet, the value of X may be found for any degree of curvature, by referring to "Henck's Field Book for Engineers," page 116, where X = tangent deflection, nearly.

JOHN WATERHOUSE, C. E.

New Rule for Elevation of Outer Rail on Curves.

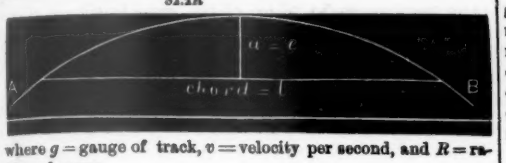
TO THE EDITOR OF THE RAILROAD GAZETTE:

Every engineer is acquainted with the theoretical rule as given in the field pocket-books (Henck's, for instance). Many, also, have rules of their own. All of them, as far as I am acquainted, are based upon the *radius* or *degree* of the curve, which is frequently unknown. Moreover, the rule must often

* This line, which was beyond the printer's art to represent, the reader may draw with a pencil from the left hand upper corner of the top square of the second column from the left to the left-hand lower corner of the bottom square of the second column to the right.

be applied by section men, who must generally guess at the degree of the curve. In an article by James Poice, C. E., on "Testing of Rails" (published in proceedings Institute of Civil Engineers), he gives a rule (before unknown to me) which I thought was far more simple and applicable than any of those old rules. Believing it would be of interest to your readers I take the liberty of drawing their attention to it.

Henck's formula is $e = \frac{g\ v^2}{32.2R}$ = elevation;



where g = gauge of track, v = velocity per second, and R = radius of curve.

Let (in figure) $A\ B$ represent outer rail of curve, l = a chord whose versed sine a equals e, the elevation of the outer rail.

We know from geometry that $R = \frac{l^2}{8a}$ approximately. Substituting in above value of e, we get:

$$e = \frac{8\ g\ v^2}{32.2\ l^2} \times e \quad \therefore \quad \frac{8\ g\ v^2}{32.2\ l^2} = 1, \text{ or } l = \frac{v}{2}\sqrt{g}$$

For a gauge of 4 ft. 8½ in. and a velocity of 10 miles per hour,

$$l = \frac{5{,}280 \times 10}{60 \times 60 \times 2}\sqrt{4.7} = 15.9 \text{ feet.}$$

Or, a chord of 16 feet (for round numbers) or *any* curve has a versed sine which equals the necessary elevation for the 4 ft. 8½ in. gauge at 10 miles velocity.

For a velocity of 20 miles, take a chord of 32 feet; 30 miles, 48 feet, etc.

Our rule, therefore, becomes for *this gauge* as follows:

Multiply 16 feet as many times as 10 miles is contained in the required velocity in miles per hour. This will give the length of chord, upon any curve, whose versed sine equals the desired elevation.

As upon each particular road a certain velocity is adopted for the whole road, or at least a whole division, the rule can be further simplified for the use of section men by instructing them to elevate all curves to an amount equal to the middle ordinate of a chord of a fixed length suitable for the required velocity.

Believing this rule to be so much simpler, while being theoretically correct, than those in general use, I submit it for the benefit of those who may not be acquainted with it.

For a gauge of 6 feet use 18 feet instead of 16 feet.

ST. LOUIS. THEODORE COOPER.

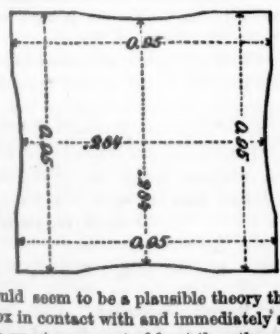
Experiments with Steel Boiler Plates.

TERRE HAUTE, May 31.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In an article upon "Steel for Locomotive Fire-boxes," in your issue of May 29, reference was made to the dissimilarity in the results of certain experiments made by Mr. Hayes and myself to test the amount of shrinkage of steel sheets by heating. In all probability the discrepancy in these results may be attributed to the difference in the manner of heating the plates. I found that when the plate was heated all over and uniformly, the contraction upon cooling was comparatively slight and uniformly distributed, but that when a portion only of the plate was heated and the remainder was protected from the direct action of the fire, there was a marked increase in the amount of contraction. For instance, after heating the plate all over for eight hours to the melting point of zinc, the contraction measured on the edges was .004 inch on three sides and .012 inch on the fourth.

It was then heated through the center four inches wide and from one side to the other, and the two outside portions were protected from the fire by bricks. On cooling, the plate had contracted .095 inch in the direction of the heating, and another heating increased the contraction in the same direction to .187 inch without materially affecting the other dimensions. To prove that the "grain" of the steel had nothing to do with the shrinkage, the plate was heated at right angles to the direction of the first partial heating, and the contraction was 0.134 inch in that direction without disturbing materially the other dimensions. An area of four inches square in the center was also heated, and the contraction showed the greatest at the sides and least at the corners, making the former concave in outline. After seven heats, two of them being all over the plate, the dimensions were found to be as given in the accompanying rough diagram. I give the amount of shrinkage from the original dimensions twelve inches square.



Now it would seem to be a plausible theory that the portion of the fire-box in contact with and immediately above the coal fire receives a greater amount of heat than the upper and more distant portions, and that if by reason of deficient and sluggish circulation or the incrustation of the sheets they are prevented from transmitting the heat to the water as rapidly as they receive it, overheating follows. When the sheets thus overheated cool down, contraction takes place, and they are thrown on a strain, to be relieved when the boiler is fired up and increased when again cooled down. This strain or tension finally becomes so great that on a sudden disturbance, when cold, the elastic limit of the material is exceeded and the fracture occurs.

This is the theory as explained by Mr. Wells, and I think gives the only rational explanation yet advanced of this otherwise unaccountable phenomenon.

There is no doubt that steel, from its being tougher, homogeneous and capable of being readily flanged and otherwise manipulated, is better than the best iron for locomotive furnaces, were it not for this unfortunate tendency to rupture. I consider it the duty of master mechanics to endeavor to discover the cause of and a remedy for this defect, and a desire to contribute my mite toward that object is my apology for inflicting this communication upon your readers.

CHAS. R. PEDDLE.

The Longest Tunnel.

KING'S MT. TUNNEL, Ky., June 9, 1875.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Allow me to correct a slight inaccuracy in Mr. Drinker's paper upon Musconetcong Tunnel. It is by no means the longest tunnel, except the Hoosac, east of the Mississippi. The "Big Bend Tunnel," on the Greenbrier Division of the Chesapeake and Ohio Railroad, is 6,400 feet long. It was begun in March, 1870, and completed in July, 1872. Mr. R. H. Talcott was Resident Engineer, and Major Peyton Randolph, now Chief Engineer of the Washington City, Virginia Midland & Great Southern Railroad, was Division Engineer. The Chesapeake and Ohio is 423 miles long, and has seven miles of tunnels.

C. E. W.

Chemical Tests of Iron and Steel.

The Committee on Chemical Research of the United States Commission for Testing Iron and Steel have issued the following Circular:

No. 89 JORALEMON STREET, BROOKLYN, N. Y., May 20, 1875.

The United States Commission on the Tests of Iron, Steel and other Metals, proposes making a series of determinations of the effects of carbon, phosphorus, silicon, manganese and other elements, upon the strength, toughness, elasticity and other qualities of iron and steel. The specimens will be analyzed by the chemists attached to the Commission and subjected to tension, torsion, compression and other mechanical tests. All experiments will be repeated often enough to reduce errors to their minima.

You would greatly aid the Commission, as well as the iron trade, by furnishing iron and steel bars, as follows:

Bars to be 7 ft. long and 1¼ in. round.

Bars to be rolled, in case you have suitable rolls; if not, hammered billets, 3 in. square by 18 in. long, to be furnished in place of bars.

Bars to be stamped on one end with the initials of the maker, and the number of the heat or charge at which they were made; or, in case there is no such record, to be stamped with the initials of the maker and numbered on one end.

A full description of the kind and make of raw materials, and of processes employed in the manufacture of the bars, and also of the size of the ingot or pile, the number of reheats, and the extent to which hammering or rolling were employed in the reduction, to be kept in a reference book—each description having a number corresponding with that of the bar—would be of great value. Such a record is, therefore, particularly requested.

Your own analyses, including color carbon tests—in case you have made them—to be given in the above description.

Your mechanical tests of the material furnished, with statement of shape and dimensions of specimens tested, to be also recorded and furnished.

Please store the bars until the Commission informs you where to send them.

KIND OF IRON AND STEEL WANTED.

Any or all the following:

1 bar of steel, containing			0.10	per cent. carbon
1	"	"	0.20	" "
1	"	"	0.30	" "
1	"	"	0.40	" "
1	"	"	0.50	" "
1	"	"	0.60	" "
1	"	"	0.70	" "
1	"	"	0.80	" "
1	"	"	0.90	" "
1	"	"	1.00	" "

After selecting these bars by means of your carbon tests, please repeat the tests, so that there may no error.

It is very important that the other elements should be uniform; therefore, these bars should be selected from charges made, as far as possible, from the same raw materials and under similar conditions.

ALSO, PLEASE FURNISH:

One bar of each of such irons or steels as may show any particularly good or particularly bad qualities, or such as may exhibit any very marked or unusual characteristics.

One bar of your best wrought iron, with its trade mark stamped on.

1 bar of very hard, but not cold-short wrought iron.

1 bar of extremely soft wrought iron.

1 bar of average "puddled steel."

Any bars which you think may be usefully subjected to these tests—specially describing the materials and processes employed in making them, and their characteristics.

When these bars are tested, it is proposed to test a series in which the manganese varies by tenths of a per cent., other elements remaining the same, and another series for phosphorus, and so on.

Tool steels will be tested in another series of experiments.

These determinations must, of course, require thousands of specimens, and be continued through a series of years. The final result must inevitably lead to a scientific synthesis in the iron and steel manufacture, by which all required mechanical qualities can be accurately produced at pleasure.

Yours truly, A. L. HOLLEY,
Chairman Committees on Chemical Research, and on Steels produced by Modern Processes.

MASTER MECHANICS' ASSOCIATION.

TESTS OF STEEL BOILER PLATES BEFORE AND AFTER USE.

The following is the report of the tests made of specimens of steel boiler plate furnished by Mr. Boon, of the Pittsburg, Fort Wayne & Chicago Railroad, and read before the late Convention of the Master Mechanics' Association:

Tests of Boiler Plates, Made at the Mechanical Laboratory of the Stevens Institute of Technology, Hoboken, N. J., May 11, 1875, by Prof. R. H. Thurston.

Laboratory number	Limit of elasticity	Ultimate strength per sq. in. of original section	Ultimate strength per sq. in. of final section	Maximum elongation	Equivalent resilience	Modulus of elasticity
388	40,180	56,024	99,345	0.773	28,871	20,090,000
389	38,562	53,205	109,532	1.059	37,502	19,286,000
390	30,928	59,983	77,371	0.289	11,557	15,464,000

The value of their resilience indicates power of resisting shock. The *used* metal is much the best.

REMARKS ON TESTS.

Boiler plate previous to and after use.—Nos. 388 and 389 were taken from a plate which had been used for some time in a steam boiler. It had no appearance of having been injured.

No. 390 was a piece of plate which had never been in use and which was said to have been made for the same purpose and to be of the same grade.

The latter statement being accurate, the effect of use is evidently to *anneal* the metal, making it softer and very much more ductile, as shown by the maximum elongation deduced by comparison of original and fractured sections.

R. H. THURSTON.

MASTER MECHANICS' ASSOCIATION.

The following are the subjects for investigation and discussion the coming year, as reported by the Committee on Subjects, consisting of Reuben Wells, James M. Boon and John H. Flynn:

1. Locomotive Tests.
2. Best Material, Form and Proportion of Locomotive Boilers and Fire-boxes.
3. Locomotive Construction.
4. Locomotive Tire, Truck and Tender Wheels.
5. Best and Most Economical Metal for Locomotive and Tender Journal Bearings.
6. Is it Economical to use Injectors on Locomotives, and to what Extent?
7. Boiler Explosions.

There were reports on the first four of these last year, but the subjects and committees were continued.

REPORT ON NARROW AND BROAD-GAUGE ROLLING STOCK.

The following report was not received in time for publication with the other proceedings of the Master Mechanics' Association:

To the American Railway Master Mechanics' Association:

GENTLEMEN: Replies were received from twelve roads, and the information obtained is embodied in accompanying table. Very full reports were made by Mr. Peddle, of the St. Louis, Vandalia, Terre Haute & Indianapolis Railroad, and Mr. Wells, of the Jeffersonville, Madison & Indianapolis Railroad.

To the question, "From your experience, which is the best gauge, narrow or ordinary (4 ft. 8½ in.)?" Mr. Peddle replies as follows:

"From my experience I would prefer 5-feet gauge to either of the other gauges, for two reasons: The first is, that a wider wheel-base would enable the modern raised-deck coaches and sleeping cars, in which the center of gravity is much higher than in the old-style coaches, to be run with greater steadiness and freedom from oscillation at high speeds. Another reason is, that it would give locomotive builders more room between the frames and enable them to lower the barrel of the boiler, and also widen the fire-box and do away with the offset in the sides, in the vicinity of the tubes, a very objectionable feature, and make them straight or narrower at the top."

The information in relation to narrow gauges (viz., less than 4 ft. 8½ in.) is too meagre to make a fair comparison between them and the ordinary gauge.

From the table it will be seen that five prefer 4 ft. 8½ in. or 5 ft. to the narrow gauge or gauges.

Two prefer gauges of 3 feet.

WM. S. HUDSON,
H. G. BROOKS,
H. N. SPRAGUE, } Committee.

Railroad Manufactures.

The Co-operative Iron & Steel Works at Danville, Pa., are at work on orders for rails and are the only iron works in that town now running.

The mills of the McCullough Iron Company at Northeast, Elkton and Rowlandville, Md., are running, but have had much trouble from want of water, they being run by water-power. Work is being pushed upon the new rolling mills at Wilmington and they will probably be finished in July.

The Indianapolis Rolling Mill is rerolling a lot of iron rails for the Terre Haute & Indianapolis Company.

The Washburn steel-tired wheel works at Hartford have begun on a large order for the New York Central & Hudson River road.

The Watson Manufacturing Company, at Paterson, N. J., has an order to replace 204 feet of a bridge at Newburyport, Mass., which was recently carried away by a freshet.

Very early on the morning of the 11th, a shed used by the Watson Manufacturing Company for storage caught fire, and for a time the whole shop was threatened. Fortunately, however, there were a number of men at work in the shops (which are running double time on the Portage Bridge work for the Erie) and they succeeded in holding the fire in check until the city fire department arrived. The loss was only about $1,000.

The Spring Works of N. & A. Middleton, Philadelphia, are running extra time on some large orders for car springs.

The Reading *Times* says: "Between 13,000 and 15,000 tons of first-class anthracite pig iron are now held in store at this place, of an aggregate value of about $400,000. The iron has been obtained from the furnaces throughout the Schuylkill and Lehigh Valley, and considerable of it is held as collateral for money advanced by foreign capitalists. A portion of it is owned by English parties and a considerable portion by the Pennsylvania Railroad. It will be held until an advance is made in the price of iron, when it will be thrown upon the market."

The Baldwin Locomotive Works at Philadelphia have a number of orders for South American roads, about 20 engines in all.

An announcement of the sheriff's sale of the spring works of Wm. H. Schoen, of Wilmington, Del., was made in this column last week, in which the shops were spoken of as the "Diamond Spring Works." It should have been the "Delaware Spring Works," and the error is the more grievous because there is in Wilmington a "Diamond State Spring Works," as many of our readers know, which has not been sold out by the sheriff or other person, and whose credit such an announcement might injure.

RAILROAD GAZETTE

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S. WRIGHT DUNNING AND M. N. FORNEY.

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Editorial Announcements.

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

THE CAR BUILDERS' CONVENTION.

Abstracts of the various reports which were read at the late meeting and not published last week will be found on another page. The prevailing opinion after the adjournment was that the meeting of this year, although not so well attended, was nevertheless of greater interest than any which has preceded it. Nearly all of the reports were prepared with great care, and the discussions thereon were full and interesting. The merchants and manufacturers of New York provided entertainment for the members, and on Wednesday evening took them all to Gilmore's concert garden. On Thursday carriages were provided, and all who desired to do so went to the races at Jerome Park. On Friday a steamboat excursion around the harbor of New York was made the order of the day. Previously an invitation was received from the Trustees of the Stevens Institute of Technology to visit it. Arrangements were therefore made to have the boat touch at the pier nearest to the Stevens Institute, thus permitting all who felt so inclined to walk up to the building, while those who were not remained on board the steamer and sailed up the North River, the boat touching at the pier on its return, thus taking the visitors to the Institute back again to New York.

The occasion was a very pleasant one, mingling as it did just enough of instruction with amusement to make it agreeable. The visitors were received on the pier by President Morton and conducted by him to the Institute building, where he had some of the most interesting pieces of philosophical and mechanical apparatus arranged on the stand in the lecture room, so that it could be shown to the visitors who were seated in front of the stand, to better advantage than would otherwise have been possible. After spending a short time in the lecture room, the visitors were conducted through the building and then into the physical laboratory, where a bountiful lunch of strawberries, ice cream and other delicacies was spread. This was followed by a few short "remarks" by Professor Thurston and Mr. Hildrup, of the Harrisburg Car Company. Altogether, the visit to the Stevens Institute was very agreeable, and evidently gave the members very great pleasure, as was indicated by the following resolution passed at the evening meeting:

"The members of the Master Car-Builders' Association hereby instruct their Secretary to communicate in writing their thanks to the Trustees and Faculty of the Stevens Institute of Technology for their very polite invitation to visit that institution and for the hospitable reception which was given to those who accepted the invitation.

"They also desire to say to the gentlemen who represent that Institution that the members of the Master Car-Builders' Association have been impressed by their visit, more than ever before, that if they expect to advance in their occupation at the same rate with which all other arts are progressing, they will be obliged more and more to seek the assistance of science, and the co-operation of those who devote their lives to its study.

"They also wish to express their thanks for the very valuable assistance which members of the Faculty of the Stevens Institute have so generously contributed to this Association during the past year, whenever their aid has been sought."

The session of this year has indicated plainly that the Association has now reached the trying period of its existence. The novelty of these meetings has been worn off, and it is that which has attracted a considerable number of persons, as is always the case with new projects. The critical period of all associations occurs when the bloom of newness has been rubbed off, and when reliance must be placed on the steady workers who labor for the cause which the Association represents, and not simply because the means employed look attractive. The meeting this year has been, we think, a turning point of this kind. The Association must hereafter depend upon its steady workers, and on those who labor for the cause represented alone. That the work which these are willing to do will afford an adequate reason for the existence of the Association, the report of the proceedings will, we think, sufficiently indicate.* The discussions this year also show that the attention of the members has been drawn more and more to the details of expenses of operating their departments. In every direction we find that careful accounts are being kept of various details of cost of repairs, of material consumed and expenses incurred. If the meetings did no other good than merely to direct the attention of the master car-builders to these questions, they would accomplish much good. The admirable plan adopted of devoting a half hour of each session to asking and answering questions at least has the effect of awakening the attention of the members and directing it to subjects which need their attention. A question asked in this way during the late session showed how very little knowledge persons may possess of facts which are very near to them. A member asked what the average life or mileage of a good car axle was, and not a man in the audience could or would answer. Several said that on the roads with which they are connected axles were removed from passenger cars after running a certain length of time and then put under freight cars, but none could say how long they run *after* being put into freight service. It is safe to predict that this inquiry will lead some of the members to seek information on this subject before the next annual convention.

We also wish to direct attention to the educating effect of preparing and answering the circulars of inquiry which are sent out by the committees. If any one wishes to appreciate this, let him undertake to write a dissertation in the catechetical form, or as question and answer, on almost any subject he may select. We believe he will be surprised to find how hard it is to write the questions, or to know what questions should be asked. To learn what to ask will oblige the writer to acquire a very full comprehension of the nature of the subject he is writing about. This is just what every committee does, or should do, in relation to the subjects submitted to it, and the circulars, when prepared with their questions, inculcate the same lesson to all to whom they are sent that the committee learned in their preparation. When, therefore, railroad managers ask what good these meetings accomplish, the answer will to a very great extent be found to be a reference to a series of mental interrogation marks made in the minds of those who are members of the Association. We believe, too, that if those higher in authority and responsibility than the master car-builders usually are would study the circulars of inquiry sent out by the Association of the latter, the former would find both edification to themselves and profit to their employers in such contemplation.

We are also glad to be able to record that the Car Builders have taken very decided ground against a practice which many of its members have for a long time believed to be "the cause of embarrassment" to them. To take such ground was an exceedingly delicate matter. To say to persons who have been hospitable to us that on the whole we think it best not to accept such hospitality hereafter is not an easy thing to do, and moreover requires some courage. The car-builders may therefore, we think, be congratulated on accomplishing this difficult task by the passage of the dignified and polite but exceedingly plain-spoken resolution, which was as follows:

"WHEREAS, the practice of entertaining the members of this Association by their friends has become an established custom, and thus assumed somewhat the character of an obligation, to which those who have so generously dispensed hospitality have, in a measure, felt obliged to conform; and whereas, the expenditure of time, trouble and money for this purpose has in many cases been very much greater than the members of this Association have the right to expect should be devoted to their enjoyment; and whereas, the acceptance of such hospitality has in some cases been interpreted as having a significance which has been the cause of embarrassment to the members, therefore they desire by this resolution, first to express their thanks for the liberality of their friends in the past, and second, to make a request in this public way, that in future there shall be no more expenditure of money for the public entertainment of the members of this Association."

The passage of this resolution, which was carried by a large and unanimous vote, will, we believe, have a very wholesome effect, and should silence some unpleasant reports which were current concerning this and kindred Associations.

*We give abstracts of the reports alone this week, but expect to publish the discussions next week.

THE CENTRAL VERMONT CASE.

The question as to which of the rival boards of this company is the legal one is now before two courts, the Vermont Chancery Court, which has or is supposed to have a general supervision of the company and its affairs, and the United States Circuit Court, into which it has been brough on the application of one or two stockholders resident in New York. It is to be hoped that a speedy decision may be reached, and one which will give some prospect that a final end may be put to the apparently endless litigation which has come to include nearly all the railroads of the State. The matter is a somewhat involved one, and it is not easy to form an opinion as to the real merits of the present phase of the case, though a brief history of it may be of some assistance.

Nearly twenty years ago the Vermont Central Railroad Company leased the Vermont & Canada road, which was an extension of its own line, the control of which was in some sort necessary to it. To secure the faithful performance of the conditions of the lease a clause was inserted which provided that in case default was made in the payment of rental, the Vermont & Canada Company might take possession of both its own and the lessee's roads and work them until the accumulated net earnings should equal the rental due. About fifteen years ago such a default was made, and the Vermont & Canada Company promptly applied to the Chancery Court for an order to put it in possession of the roads according to the terms of the lease. About the same time, we believe, the Vermont Central had failed to pay the interest on its bonded debt, and an application had been made to the Court on the bondholders' behalf, to enforce their rights. The Chancellor took both applications and granted neither, making instead an order putting both roads, the Vermont Central and the Vermont & Canada, into the hands of trustees, to be worked under direction of the Court and for the benefit of all the parties in interest.

For several years the administration of the trustees continued quietly, while the suits affecting the trust property continued, with more than the usual delays of the law, to move slowly forward. Some of the original trustees died and were replaced by others who had a more extended idea of their powers and a desire to increase their sphere of action. Gradually the *quasi* corporation which the trustees had formed expanded its operations. It leased the Stanstead, Shefford & Chambly road in Canada, which extended its line to the Grand Trunk; it leased the Sullivan road; the Ogdensburg & Lake Champlain, which gave it a line to the St. Lawrence near the foot of Lake Ontario; and in order to secure a share of through business it bought a controlling interest in the Northern Transportation Company, whose steamboats plied from Ogdensburg to the ports of the upper lakes. Finally, it extinguished competition, as far as the traffic of nearly all Vermont was concerned, by leasing the property of its great rival, the Rutland Railroad Company. This company, which had itself been bankrupt as the Rutland & Burlington, and had been sold out and reorganized by its second-mortgage bondholders, owned a line which was parallel to, though for the most part at some distance from, the Vermont Central, and had been in active competition with that road for the trade of Lake Champlain and of all Western and Middle Vermont; moreover, through its leases of the Vermont Valley and the Brattleboro Branch of the Vermont & Massachusetts, it controlled the outlet of both roads down the Connecticut Valley, in which direction much of the business of Vermont has always tended. Not satisfied with this, a few months afterwards the New London Northern road was leased, giving a line to tide-water on Long Island Sound.

Meantime these extensions of the trust had met with no little opposition, and gradually a feeling against the continued operation of much the greater part of the railroad system of the State by officers of the Court of Chancery had grown up. Charges against the trustees were freely made; it was said that by means of fast-freight lines, by car-leasing companies, by iron companies and other devices they were absorbing the property of the trust. It was alleged that leases had been taken in the name of individual trustees, who had taken the profits, when there were profits, and had thrown upon the trust the loss, when there was a loss. The old shops at Northfield had been abandoned and new ones built at St. Albans, for the purpose, it was said, of enriching certain of the trustees who were large property owners there. The funded debt had been largely increased. Last, but by no means least, it came to be said that instead of being run by the courts, the Vermont Central trust was running the Vermont courts. Much of all this, doubtless, rested on common rumor only, and was mere vague talk, not susceptible of proof; but it came to be generally believed that there was

some foundation for the charges, and it was too evident that the continuance of the trust was becoming a grave public scandal. Moreover, the operations of the trustees had not all been successful, and they had come, in 1872, to be seriously embarrassed financially. The question had entered to some extent into the politics of the State, and the Legislature of 1872 felt bound to do something in the matter.

What to do was the question. The old Vermont Central corporation had utterly lapsed and disappeared, and there was no existing one to take its place. There was much opposition to and many reasons against a complete termination of the trust and the breaking up of the combination it had formed. Finally, the Legislature provided for the formation of an entirely new corporation, to be known as the Central Vermont. This new organization was to take the Vermont lines included in the trust, either originally or otherwise, to work them in the first place as trustees, and then gradually to acquire their ownership by consolidation if it could be done, or by direct purchase. Early in 1873 the stock books were opened and a large amount of the capital, which was to be a basis upon which the company could operate, was subscribed, and in May the corporation was organized.

Two parties were represented in this organization, one the trustees who had so long controlled the roads, while the other party was understood to represent the New York, Boston & Montreal, a company which at that time was promising much for the future, though it had as yet accomplished but little. The latter party was again divided into two sections, one the original promoters of the New York, Boston & Montreal, the other consisting of Mr. Trenor W. Park, Mr. Wm. Butler Duncan and others who were brought in through their interest in the Harlem Extension, which had then been made a part of the New York, Boston & Montreal combination. The New York party, however, did not remain long connected with the Central Vermont, and less than a year later nearly all of their stock was sold out, most of it, as was stated at the time, going into the hands, or at least under the control, of Mr. John B. Page, the President and the leading man in the Rutland Company.

Meantime little had been done in the way of bringing about the promised consolidation, and the affairs of the trust were still in an uncertain condition. A contract was made for the purchase of the Vermont & Canada road, to the execution of which, however, legal obstacles were interposed, and within a few months past an agreement was prepared which was to arrange the transfer of the Vermont Central to the new company, but which is still incomplete. A new source of complaint, however, had been found; it was charged that the Rutland interest had gradually become a controlling one, that the lessor was absorbing the lessee, or, as it was worded in a rather startling way, that "The Rutland people had bought a controlling interest in the trustee." The old trustees, who were now the controlling party in the management, appear, however, to have been on good terms with the Rutland people, and, to outsiders at least, there were no symptoms of trouble.

The capital which was to be subscribed to the company was fixed in the first place at $2,000,000, and of this 17,650 shares (of $100 each) had been taken and one half the par value of each share paid in. It is said that lately an agreement was made by which this half-paid stock was to be returned and each holder was to receive full-paid stock for the amount he had actually paid in, leaving a large amount of stock in the treasury, but this was not carried out, and the stock remained as before, 17,650 shares in the hands of various holders and 2,350 shares in the treasury. It also appears that at some time some of the stock outstanding had come into the hands of Mr. Bradley Barlow, of St. Albans, Messrs. Brooks and Sohier, of Boston, and one or two others who are directors or stockholders of the Vermont & Canada and have been prominent in opposition to the Central Vermont, or at least to its recent management. Just before the recent election it appears to have come to the knowledge of Ex-Governor J. Gregory Smith and Mr. W. C. Smith, who were the leading spirits of the old trusteeship and then of the present company, that Governor Page and the Rutland party had joined hands with Mr. Barlow and his friends, and that they intended to vote out the Smiths at the then approaching election, and it was altogether likely that they had the stock to do it. Indeed, as appeared subsequently, they controlled 9,000 shares—a clear majority of the then outstanding stock. Something must be done at once, and something was done. The directors were summoned by telegraph to Bellows Falls; some of them came, but the time was too short, and the meeting adjourned to a passenger coach on its way to St. Albans. Even then no quorum was present, but the one director needed to make up the quorum got upon the train at a way station, and business proceeded. The meeting voted, after a little other business had been done and inspectors of election appointed, to raise the money needed for an approaching interest payment due on the Vermont & Canada purchase by the sale of the 2,350 shares remaining in the treasury. Under authority of that vote the shares were issued as soon after the train arrived at St. Albans as it could be done, and but a few minutes, it is said, before the stockholders' meeting began. They were issued to two parties, one the Superintendent of Traffic of the road, the other a director in the Smith interest. It is charged that the Treasurers' books show no consideration received for that stock, and that one, at least, of the directors present at the meeting on the cars endeavored to record his protest against the action taken.

The stockholders' meeting proceeded, and the new stock was received and counted by the inspectors against the recorded protest of the opposition. Five directors out of the thirteen (including Governor Page) received all the votes cast, and as to their election there is no doubt. Of the other eight those on the Page ticket received 9,000 votes each, those of the Smith party 10,749, including the new stock. The Page party refused to recognize the legality of the new issue, and have organized by themselves, electing a full complement of officers. The Smith board has done the same and now holds the property.

Whether the hasty issue of the 2,350 shares was technically legal or not, there can be no moral doubt that it was an extremely dubious transaction. Below or beyond this, however, are considerations which may seriously affect the equities of the case. The real owners of the property and those upon whom all the losses caused by its former and present embarrassments have fallen and will fall are undoubtedly the bondholders, and their rights may be seriously affected by the decision of the question whether the St. Albans or the Rutland interest is to control the reorganization of the property. From this point of view, perhaps, it would not be an unjust conclusion if the authorities should see fit to renounce the Central Vermont and all its works and should devise some new scheme by which the property should be turned over to the bondholders to do with as they will. At present, however, this does not seem to be a likely solution of the problem, and it is too probable that the property will be buried deeper yet under its load of litigation and of debt.

INDEPENDENCE IN MAKING RATES.

Mr. John W. Garrett, in his numerous expressions of opinion on the railroad war in which his company is a party, has always placed a good deal of stress on his determination to maintain the "independence" of his line He did not claim the right to dictate rates to and from all Eastern ports, but he should insist on making such rates to Baltimore as might seem best for his peculiarly Baltimore road. This was a matter which seemed to him worth fighting for.

Now independence in the conduct of one's business is always desired, and most men, probably, will sympathize with the Baltimore & Ohio Company in its aim to maintain it. But independence in railroad and most other business is something like the freedom of the individual: it does not mean the right and power to do whatever one pleases, but such a right greatly limited by an observance of the rights and welfare of others, in many things limited by human laws, but in many more quite as efficiently limited by natural laws, the laws of trade, and the dispositions of one's fellow men.

Let us suppose that the Baltimore & Ohio Railroad Company is granted perfect freedom to make rates to Baltimore just as it pleases, and that it pleases to make the Baltimore and Chicago rate on fourth-class freight fifty cents per hundred. Now, there is another line to Baltimore connected with most of the country reached by the Baltimore & Ohio. Suppose this company decides to make the rate forty cents. It finds no fault with the Baltimore & Ohio, neither does any other railroad company. The Baltimore & Ohio is perfectly independent in making its rate. But its "independence" is not worth much to it: it may choose its rate, but it can get no traffic under it. The other road gets it all.

But, it is said, the Baltimore & Ohio does not wish to make a higher rate than the other company, but a lower one. Then it means by "independence" the right to make rates as low as it pleases only, which is certainly a limited independence, as all commercial independence must be—limited by the law that no one can sell goods or service of the same kind at a higher price than his competitor charges. But if this limited independence is granted to the Baltimore & Ohio, what becomes of its competitor? Evidently the independence of one is the slavery of the other. The Baltimore & Ohio cannot make a lower rate to Baltimore than another road to that place. The lowest rate necessarily is the rate for all competitors offering the same quality of service.

But Mr. Garrett probably means that he shall insist on making whatever difference he thinks best between the rates to and from Baltimore and those to and from New York, Philadelphia and Boston, and in this again he probably has the sympathy of a great many disinterested men. If the coffee and sugar rate from New York to Chicago is 30 cents, probably most men would see nothing improper in the Baltimore & Ohio making that rate 20 cents, to encourage the traffic of its road and the trade of Baltimore.

But with the existing condition of things, all the seaports mentioned being competitors for the reception and export of the same products and the importation and sale of the same merchandise, it is impossible to make any considerable difference in the rates to and from these places, just as much as it is to make different rates by different routes to the same place.

The Baltimore & Ohio, let us suppose, has made its exceptionally low sugar and coffee rate. The result is—or would be if a similar reduction were not made from the other cities—that the supplies for the interior are bought chiefly at Baltimore, that the Baltimore refiners and the Baltimore merchants flourish at the expense of those in New York and Boston, and last but not least, that the railroads to these latter places lose their traffic in these staples. Of course the railroad companies will not give up their traffic, and they will reduce their rates until they are low enough to prevent its diversion. Here the Baltimore line has been perfectly "independent," but its independence has not enabled it to make the difference it desired between New York and Baltimore rates.

Now, just exactly this process goes on with the rates on every kind of traffic. If the companies do not agree upon uniform rates and fixed differences, their competition for traffic will always make such rates and such differences. A railroad war from now until the end of the century would not make it possible to keep rates to Baltimore so much lower than to other ports that the latter would lose their traffic or any considerable proportion of it.

But it must not be forgotten that the converse is equally true. It is idle to attempt to deprive Baltimore and the Baltimore & Ohio Railroad of that proportion of the trade of the country which their natural advantages entitle them to. What that proportion is we cannot say: the competition is determining it. But we may be sure that no agreement which will deprive the Baltimore & Ohio of the profits which it might make at lower rates than those agreed upon will, even if entered into, be permanent. Neither the road nor the city will throw away its advantages. If the Baltimore & Ohio can make more profit with a grain rate six cents instead of five lower than the New York rate, it will not long adhere to the latter rate, and of course it should not. But this difference and its effect on profits must be calculated in connection with its effect on all lines competing for the same traffic. It will not do to assume that because the railroad can make more at thirty-four cents than at thirty-five when the New York rate is forty, therefore it is best for it to insist on thirty-four, until we know what the effect will be on the New York lines; whether they will not, and whether, in fact, they will not be virtually compelled to reduce their rates likewise, and so either destroy the Baltimore traffic or compel the railroad to take it, not at the desirable rate of thirty-four cents, but at the undesirable and probably unprofitable rate of thirty-three, thirty—twenty-five, perhaps.

The same objection applies to Mr. Hugh J. Jewett's proposition to make rates from the West to New York as low as to other seaboard cities, by which he means as low as to Baltimore and Philadelphia, the only places which have lower rates. We do not believe that it is possible, under any circumstances, to do this. It would be equivalent to depriving Baltimore and Philadelphia of nearly all their trade in the great staple products which they receive, and the Baltimore & Ohio Railroad of its traffic in those staples. Of course that road would meet reduction by reduction. It would have to do so to preserve its traffic. Should it be compelled to pass its dividends or default on its mortgages, that could make no difference, for it would lose its profits equally, together with its traffic, did it make no reduction; and finally, so long as it could make enough to pay working expenses, it would maintain such a difference in rates as would enable it to get a share of the traffic. This is on the assumption that it costs less to carry to Baltimore than to New York, which is probably true of Cincinnati and Louisville, and other towns south of the Lakes, though it may not be true of Chicago and most of the Northwest.

The conclusion of the whole matter is that there is not, and in the nature of things there cannot be anything like independence in making the rates to and from cities like Baltimore, Philadelphia, New York and Boston. Uniformity and necessary differences will be arrived at, if not by mutual agreement, by competitive contests, in which, usually, all the carriers will lose a great deal of money and the business of the community will be unsettled. There is hardly any choice as to the final result, the only option is as to the means of arriving at it, which may be by agreement, by arbitration or by war. The settlement by war is costly and disgraceful, but it will not be obviated by arbitration or agreement unless the latter result in an *equitable* arrangement, which probably is really the reason why they are not oftener resorted to.

Narrow-Gauge Reasoning.

Among the incidents of this world death and taxes have always been counted as absolutely sure. To those of late years there has been added another which may be relied

upon with almost equal certainty. This is narrow-gauge sophistry. It is quite useless to point out, as has been done over and over again, the errors of fact and fallacies of argument, and to show that the sweeping conclusions and deductions rest only on hollow generalities. Their growth seems to be the result of some sort of spontaneous generation, the germs of which are indestructible. It makes very little difference how often the crop grown from this seed is cut down, as it is cultivated for fodder for the ignorant and is fed with an unsparing hand to any dull enough to feed on it.

We have before us several specimens of this sort of growth, which seem to have been developed by the warm Spring weather. One of these is in the form of a cheap pamphlet, with the title, "Five Reasons why the People of Iowa should Encourage the Construction of Narrow-Gauge Railroads." The author's name is not given, but it obviously is issued as a sort of predatory document, to induce those who have lost confidence in other railroads in that State to try the narrow-gauge lay. As a choice example of narrow-gauge logic, we submit the following extract as incomparable: "If the outside rail of a narrow railroad is 50 feet longer on a certain curve than the inside one, and the outside rail of a broad road, 20½ inches further out, is 40 feet longer than the inside rail of the narrow, this evil is aggravated to that extent, and that additional amount of steam power is wasted in overcoming it." The author of this remarkable problem has failed to indicate on what sort of a curve the difference between the length of the inner and outer rails of a narrow railroad is 50 feet, but as the difference in the length of the inner and outer rails of a complete circle of *any* curve is only equal to the circumference of a circle whose radius is equal to the gauge, or 18.8 feet when the latter is three feet, we infer that the curve he has selected must be a spiral. As it is not usual to build railroads in that form nor even in complete circles, perhaps it may occur to some of the readers of this document that the advantages claimed are somewhat highly colored.

The last number of *Engineering* also contains an article on the same topic, the special occasion of which is the review of a paper by Dr. William Pole on the "Early History of the Railway Gauge." The following quotation is from the remarks of *Engineering*, excepting that we have italicised some portions of it:

"We now come to the question as to the advantages of the narrow-gauge lines which are now being so extensively built in almost every part of the world where railways are known. Respecting these lines our opinions are—as our readers scarcely need to be reminded—diametrically opposed to Dr. Pole's, and we have on many occasions entered into the matter so fully that it will only be necessary for us to speak concerning the salient points here. Dr. Pole insists that so long as the rolling stock is made to suit a given traffic the width of the gauge can make no material difference in the cost of the line, for he says, 'the cost of the permanent way must depend upon the weight to be carried, while that of the overworks can only be governed by the dimensions of the loaded vehicles, into neither of which elements does the gauge necessarily enter.' That he should insist upon such a statement as this is we think a remarkable exemplification of his own words already quoted, 'how, in spite of the general spread of scientific knowledge, the most incomprehensible delusions may prevail.' We should have thought that everybody conversant with railway construction and working was aware that the fact of a given traffic having to be accommodated by no means at once fixes the best proportions of the rolling stock to be employed. These proportions in fact are to a large extent dependent upon the gauge, and are not, as Dr. Pole appears to suppose, dominant over the latter. It is quite true that in some instances the fact of certain articles having to be transported may fix the minimum width of vehicle admissible, but in all ordinary cases the width thus demanded is well within that which can be provided on such narrow-gauge lines as we advocated, and such as are being made in India, so that this point does not enter into the discussion. *As far as general merchandise is concerned, the proportions of the vehicles used for conveying it can be varied within wide limits without introducing any practical inconveniences.* It thus by no means follows, as Dr. Pole appears to suppose, that to accommodate a given traffic, the vehicles will, or ought to be, made of a certain width, whatever the width of the gauge may be. On the contrary, it will be found that for every gauge there is a certain width of vehicle which gives the most beneficial results as regards proportion of dead weight to paying load, and necessarily this width becomes less as the gauge is reduced. This being so, Dr. Pole's assertions about the cost of permanent way and overworks at once fall to the ground, *for the narrower the rolling stock the less is the weight per foot run of train, and hence the less is the strain thrown upon the permanent way*, while of course with a reduced width of wagons the less can be the span of the over-bridges. In other words, the adoption of a narrow gauge enables a certain weight of train to be distributed over a greater length of line than would be possible with a wider gauge, unless in the latter instance vehicles of a type which might be justly characterized as 'abnormal' were employed."

We have repeatedly called attention to the fact that the great argument in favor of the narrow guage is that the permanent way may be lighter, because the rolling stock weighs less, and that the latter is due to its *narrowness*, "for the narrower the rolling stock the less is the weight per foot run of train." It will be observed that the whole advantage of the narrow guage is in this reasoning attributed to *the narrowness* of the rolling stock. Now, if these very great advantages are due simply to the narrowness of the rolling stock, then the enquiry would naturally arise, whether narrow cars might not be used without "pushing the wheels together." Our contemporary anticipates this, but says that if you do this the cars will be "abnormal." Precisely what would happen if cars were "abnormal" we don't know, but the definition given to that word is "not conformed to rule; irregular; deformed." Now to what rule is it that narrow cars for a wide-gauge road do not conform? In what respect would they be "irregular" or "deformed"? Like the defendants in a noted trial, we feel inclined to ask for a "bill of particulars."

Accident to a Boston Express Train.

The following report of an accident which occurred last Saturday night we cut from the New York *Herald* of Sunday morning. As one of its reporters was on board the train, it is probable that the report is more accurate than such accounts are apt to be when the facts are gathered after the occurrence of the event. The report is dated at Morrisania, June 12:

"The Boston Express, due in New York at twelve minutes past eleven last night, was thrown off the track at 178th street, Tremont, at ten minutes to eleven p. m. The two sleeping coaches, Knickerbocker and Granite State, were thrown from the track, and the first fell in a position at a right-angle from the rails. The car had on board Speaker Blaine and Miss Annie Louise Cary, the vocalist. Vice-President Wilson was on the second car, the Knickerbocker. This car fell over the track, resting at an angle of forty-five degrees; the wheels were broken and emitted sparks of fire and a volume of smoke as the car fell over. This gave rise to a rumor that the catastrophe originated from a wheel on fire. The passengers in the first and second coaches were extricated by breaking the windows with handspikes and a few were found to be seriously injured. The passengers in the rear coaches were many of them awakened from a sound slumber, and a *Herald* reporter, who was asleep in the smoking car, was thrown from his seat and alighted in the midst of a dense and excited crowd.

"On reaching the ground the reporter discovered that the platform in front of the Tremont depot was torn into a thousand fragments, and the debris lay scattered around in every direction. The engine was dispatched to New York to procure the assistance of a wrecking train, and in the meantime a general effort was made to discover the cause of the catastrophe. The entrails and various parts of some large quadruped were found lying upon the track, covering a distance of some two or three blocks, and the general impression was that the displacement was caused by a horse which strayed upon the roadway."

What we wish to call attention to is the fact that many of the cars on the through lines between Boston and New York are run without safety chains on the trucks. Whether the sleeping cars named had such safety appliances or not we are unable to say with certainty; but the fact that the cars assumed a position at "a right angle to the track" indicates that the trucks must have turned under the cars, which would not have occurred if they had been adequately fastened with safety chains. We do not hesitate in expressing the opinion that if the cars had all been provided with safety chains to the trucks sufficiently strong for the purpose for which such attachments are intended, the trucks would not have turned around and no injury would have been done to the passengers, and much less to the train. Neither the engine nor the front mail car were thrown off the track, and if the trucks of the cars further back in the train which were thrown off had been kept in line with the rails, the wheels would have run over the cross-ties without doing serious injury until the speed of the train had been arrested.

The recorded testimony* in favor of the value of safety chains in case of accident, is now so distinct and explicit, that no railroad company should assume the legal risk incurred by running cars without them, to say nothing of the danger to life and limb to which every passenger is now exposed who travels on trains the cars of which are not provided with such chains.

To quote a remark which an experienced railroad man made since the above accident occurred, "safety chains are not a bit of use as long as cars stay on the track;" but when they get off it often makes all the difference between life and death, if the cars are or are not supplied with them. It is, probably, because their use is only apparent when an accident occurs that some railroad men are so slow to adopt them on all passenger cars. Many of the latter running between New York and Boston are either not provided with them at all, or else their attachments are so weak as to make their use a farce, were it not for the danger of a tragedy which now attends every journey between these two cities. The fastening of the chains on the trucks of the drawing-room cars on the through lines between these cities is simply absurd, if the work which they must do is taken into consideration. Fortunately, the late accident, while it indicated the necessity of having adequate provision for holding the trucks in cases of derailment, did not result in loss of life, excepting to the unfortunate horse. We would be glad to feel assured that there would be similar immunity from serious disaster in cases of accident in future on that and other lines. In view of the fact that safety chains are either not used at all or are so carelessly constructed, we will venture far enough into the dangerous region of prophecy to record our belief that if some of the roads leading out of New York do not provide well constructed safety chains to their passenger cars, the value of such appliances in diminishing danger will be eventually inculcated at a great cost of life and suffering.

Record of New Railroad Construction.

This number of the *Railroad Gazette* has information of the laying of track on new railroads as follows:

New York & Long Branch.—Extended southeastward 9 miles from Middletown, N. J., to Long Branch, completing the road.

West End Narrow Gauge.—Track is laid on this suburban line from Grand avenue in St. Louis westward 7 miles. It is of 3-feet gauge.

This is a total of 16 miles of new railroad, making 296 miles completed in the United States in 1875, against 537 miles reported for the same period in 1874, and 1,181 miles in 1873.

Commencement of the Stevens Institute of Technology.

The graduating exercises of the first class that has received diplomas from this institution was held in the large lecture hall of the Institute at Hoboken on the evening of June 14. The introductory address was made by President Henry Morton, the address to the graduating class by Professor R. H. Thurston, and the conferring of degrees by Rev. S. B. Dod, President of the Board of Trustees. The following are the names of the graduates and the subjects of Theses:

Valentine Bachmann, Ky., Flouring Mills; Jas E. Denton, N. J., Theory of Traction of Locomotive Engines; J. Hector Fezandie, N. Y., Heating and Ventilating; Thos F. Koezly, N. Y., Sugar Refining; Frank M. Leavitt, N. J., Design for an Overshot Water Wheel; Adolph Sorge, N. J.. Design for a 50 Ton Floating Derrick; George Barry Wall, N. J., Wire Rod Rolling and Wire Drawing; Yokichi Yamada, Japan, Design for a Turbine Water Wheel.

*See reports of Master Mechanics' Association for 1873, and Master Car Builders' Association, 1874.

General Railroad News.

ELECTIONS AND APPOINTMENTS.

Cumberland & Ohio.—At the annual meeting in Louisville, Ky., June 2, the following directors were chosen: W. H. Dulaney, John T. Moore, Louisville, Ky.; Gideon King, Henry County, Ky.; J. A. Middleton, A. B. Veech, Shelby County, Ky.; Dr. J. R. Hughes, Nelson County, Ky.; S. R. Norman, Spencer County, Ky.; N. S. Ray, E. B. Phillips, Marion County, Ky.; A. F. Gowdy, Taylor County, Ky.; E. H. Hobson, Green County, Ky.; Joseph H. Lewis, Barren County, Ky.; T. S. Grundy, Washington County, Ky.; T. Manlon, Allen County, Ky.; J. J. Turner, Sumner County, Tenn. The board elected officers as follows: President, W. H. Dulaney; Vice-President, J. J. Turner; Secretary and Treasurer, J. H. McElroy; Executive Committee, W. H. Dulaney, J. J. Turner, E. H. Hobson, N. S. Ray, A. B. Veech.

Gilman, Clinton & Springfield.—At the time appointed for the annual meeting in Springfield, Ill., June 8, stockholders representing $402,000 of stock met and elected the following directors: Thomas Snell, E. H. Palmer, J. H. Randolph, M. Donohue, L. Campbell and J. Marsh, of De Witt County; T. D. Spalding, of Gibson; John McConnell and J. M. Stout, of Sangamon; H. Crawford, of Chicago; and S. L. Beidler, of Logan County. The board subsequently met and organized by the election of the following officers: President, Thomas Snell, Clinton; Vice-President, T. D. Spalding, Gibson; Secretary, A. Pickard, Springfield. The board, last year, were elected for one, two and three years, but no attention was paid to this, and a full board was elected as though the term of all last elected was for one year. The representatives of the $1,400,000 stock held by the Morgan Improvement Company were prevented from voting by an injunction.

Toledo & Grand Rapids.—At the annual meeting recently, T. M. Cook, C. H. Coy, D. W. H. Howard, G. P. Hinsdale, George Laskey, Thomas Pray and G. W. Reynolds were chosen directors. The board elected D. W. H. Howard, President; G. P. Hinsdale, Vice-President; C. W. Shoemaker, Secretary and Treasurer.

South Mountain & Boston.—At the annual meeting in Blairstown, N. J., recently, the following directors were chosen: Joseph Anderson, J. O. Bartow, John Bunnell, Joseph B. Cornish, H. G. Eastman, C. V. Moore, Jacob C. Van Horn, Frank M. Ward, C. A. Wortendyke. The board elected J. B. Cornish, President; Samuel H. Lanterman, Vice-President; Marshall Hunt, Secretary; Isaac Wildrick, Treasurer.

Junction & Breakwater.—Mr. Thos. McCoy has been appointed Auditor of the Junction & Breakwater, the Breakwater & Frankford, and the Worcester Railroads, and will have charge and direction of all the accounts relating to the earnings and expenses of the roads. The heads of all departments will report to him in all that concerns his department, in the form and manner required by him. Officers of connecting transportation lines are asked to recognize, accordingly, any communications received from him. Letters and reports will be addressed to him at Lewes, Delaware.

Genesee Valley.—The Rochester City Council has chosen as city directors of this company John Lutes, Johnson I. Robbins, James Brackett, E. R. Hammatt, Amos Bronson, G. H. Perkins, D. W. Powers.

Keokuk & Des Moines.—At the annual meeting in Keokuk, Ia., June 3, the following directors were chosen for three years: Henry A. Barling, W. C. Duer, C. Seguin Johnson, all of New York.

Woodbury & Gloucester.—The first board of directors of this new company is as follows: Robert K. Neff, Henry C. Clark, Thomas Glover, Sr., W. Harrison Livermore, G. M. Tatem, Adon W. Cattell, John M. Henderson, Thomas B. Smith, Wellington I. Adams, Samuel W. Stokes, William C. Stokes, John J. Estell, James P. Michellon. The company's address is at Woodbury, Gloucester County, New Jersey.

Lake Superior & Mississippi.—At the annual meeting in St. Paul, Minn., June 7, the following directors were elected: J. P. Ilsley, E. W. Clark, F. H. Clark, James Smith, Jr., B. S. Russell, C. H. Graves, William Dawson, Dr. J. H. Stewart, S. M. Felton, Isaac Hinckley, George Burnham, George Whiting, William G. Moorhead. The board elected J. P. Ilsley President and Land Commissioner; Thomas M. Davis, Secretary and Treasurer; George H. Smith, Superintendent.

Quincy & St. Paul.—The new board of directors is as follows: J. M. Mason, C. L. Thompson, St. Louis; N. D. Munson, T. T. Dwight, C. H. Spencer, Quincy, Ill.; J. W. Kettle, Keokuk, Ia.; H. H. Trumble, Bloomington, Ia.; W. Hill, Bloomfield, Ia.; A. J. Morrison, P. H. Callen, M. V. B. Howell, L. C. Thompson, Moulton, Ia.; W. G. Downing, Memphis, Mo.; G. M. Ochiltree, Waterloo, Ia.; E. P. Buell, Warsaw, Ill.—The directors have elected the following officers: President, T. T. Dwight: Vice-President, E. P. Buell; Treasurer, A. J. Morrison; Secretary, C. H. Spencer; Attorney, H. H. Trimble.

Syracuse Northern.—The directors have elected the following officers: President, J. J. Belden; Vice-President, Tobias W. Green; Treasurer, E. B. Judson; Secretary, R. D. W. Mann.

Woodstock.—Mr. Frank N. Billings, of Woodstock, Vt., has been chosen Vice-President.

Utica, Ithaca & Elmira.—The following directors have been chosen for the ensuing year: W. L. Burt, Joseph Rodbourn, Geo. J. Magee, H. P. Goodrich, C. C. Taylor, H. W. Poor, Edwin Eldridge, Jas. Rodbourn, O. B. Curran, John McGraw, J. H. Selkreg, A. B. Cornell, R. H. Deuel.

Chicago & South Atlantic.—The directors of this newly organized company have elected officers, as follows: President, W. O. Foley; Vice-President, J. Cavendish Robinson, of Chicago; Treasurer, John H. Piercy; Secretary, Will. A. Pelle, Jr.

Peoria, Pekin & Jacksonville.—At the annual meeting in Pekin, Ill., June 9, the following directors were chosen: James M. Constable, John Allen, Lucius Hopkins, Richard Arnold, James F. Kelsey and Lebbeus Chapman, Jr. At a subsequent meeting of the directors John Allen was re-elected President and Superintendent and L. Chapman Secretary.

Erie.—Mr. E. R. Wadsworth, formerly for many years General Freight Agent of the Chicago, Burlington & Quincy, and lately one of the Western Commissioners under the Saratoga agreement, has been appointed General Agent for the Northwest.

Atchison & Nebraska.—Mr. J. Thompson, Jr., late of the Chicago, Burlington & Quincy, has been appointed General Freight and Ticket Agent, with office in Atchison, Kan.

Chicago & Southwestern.—At the annual meeting at the east end of the Leavenworth Bridge, June 9, the following directors (one-third of the board) were re-elected for three years; John F. Tracy, Hugh Riddle, H. H. Porter, Chicago; M. Courtright,

Erie, Pa. The board elected John F. Tracy, President: James N. Burnes, Vice-President; H. M. Aller, Secretary. The road is leased by the Chicago, Rock Island & Pacific Company.

Detroit, Lansing & Lake Michigan.—Mr. J. F. Reevie, now Accountant, has been appointed also General Passenger Agent, with office at Ionia, Mich.

Chicago, Milwaukee & St. Paul.—At the annual meeting in Milwaukee June 12, the new law was accepted, and a full board of directors elected as follows: Alexander Mitchell, John Plankinton, Milwaukee, Wis.; Joseph G. Thorp, Madison, Wis.; Jonathan N. Bowman; Kilbourn City, Wis.; Peter Geddes, Chicago, Ill.; Selah Chamberlain, Cleveland, O.; James Buell, John M. Burke, David Dows, Elias L. Frank, Walter S. Gurnee, Julius Wadsworth, New York; F. A. Mueller, Amsterdam, Holland. The new directors are Messrs. Plankinton, Thorpe, Bowman, Geddes, Burke and Dows, who succeed Mr. S. S. Merrill, of Milwaukee (General Manager of the road), Russell Sage, N. A. Cowdrey, James L. Garner, Levi P. Morton, and H. S. Taylor, of New York. The Mitchell party was entirely successful, as was generally expected. The board elected Alexander Mitchell, President; Julius Wadsworth, Vice-President; S. S. Merrill, General Manager.

New Hampshire Railroad Commissioner.—None of the candidates having received a majority of the popular vote at the recent election, the Legislature met in joint convention, at Concord, June 9, and elected Charles H. Powers, of Jaffrey, Railroad Commissioner.

Dutchess & Columbia.—The officers of this road are: Jos. F. Joy, Receiver; C. L. Kimball, Superintendent; Justus E. Ralph, General Freight and Passenger Agent. The Receiver's office is at No. 61 Wall street, New York; the other offices at Fishkill, N. Y.

New Jersey Midland.—Mr. Duane Searle is Master Mechanic.

Burlington & Missouri River in Nebraska.—Mr. W. D. Cowles has been appointed General Freight and Ticket agent, in place of Mr. Wm. Irving, appointed Superintendent.

Oregon Central.—The new board of directors, elected by a part of the stockholders, has chosen J. Gaston, President; C. H. Kimball, Secretary; J. L. Hallett, Superintendent. The old officers refuse to recognize the authority of the new board.

St. Paul & Pacific.—At the annual meeting, in St. Paul, Minn., June 8, the following directors were chosen: George L. Becker, D. S. Breed, T. B. Campbell, F. R. Delano, E. B. Litchfield, E. C. Litchfield, Wm. Savage.

Evansville, Terre Haute & Chicago.—At the annual meeting, in Terre Haute, Ind., June 8, the following directors were chosen: H. W. Beckwith, E. M. Burson, Josephus Collet, J. E. Martin, Claude Matthews, W. R. McKeen, C. Y. Patterson, Chauncy Rose, J. M. Smith.

Saratoga & Schenectady.—At the annual meeting in Waterford, N. Y., June 7, the following directors were chosen: George T. Cramer, A. de F. Gale, E. T. Gale, George M. Tibbetts, Joseph M. Warren, Stephen E. Warren, Troy, N. Y.; James M. Marvin, Saratoga Springs, N. Y.; Charles Cramer, Waterford, N. Y.; H. E. Lockwood, St. Albans, Vt. The road is leased to the Rensselaer & Saratoga and subleased to the Delaware & Hudson Canal Company.

Rensselaer & Saratoga.—At the annual meeting in Waterford, N. Y., June 8, the following directors were chosen: George H. Cramer, James Forsyth, Joseph W. Fuller, E. T. Gale, Wm. Howard Hart, Wm. A. Shepard, George B. Warren, Joseph M. Warren, Thomas White, Troy, N. Y.; Isaac V. Baker, Comstock, N. Y.; Charles Cramer, Waterford, N. Y.; W. H. Vanderbilt, New York; Thomas Dickson, Scranton, Pa. The road is leased to the Delaware & Hudson Canal Company.

Chicago & Northwestern.—A blunder in "making up" last week put the most of the re-elected officers of this company under the head of Chesapeake & Ohio Canal, whose own proper officers occupy only the first four lines of the paragraph headed by its name.

Memphis & Knoxville.—Hon. John C. Brown, Pulaski, Tenn., and L. B. Adams, Bolivar, Tenn., have been chosen directors in place of T. J. Davie, resigned and D. E. Wells, deceased.

Red River Valley.—The board of directors of this new company is as follows: George L. Becker, R. B. Galusha, P. H. Kelley, L. E. Reed, Gen. H. H. Sibley.

PERSONAL.

—Mr. George Young, formerly a well-known railroad man and at one time Superintendent of the Dubuque and Sioux City Railroad, died in Lowell, Mass., June 8.

—It is reported that Mr. James F. Joy has given up his intention of retiring from the presidency of the Michigan Central at the coming election, and that he will then be a candidate for re-election.

—Mr. A. H. Perry, formerly for several years Superintendent of the Connecticut & Passumpsic Rivers Railroad, and recently for several years General Superintendent of the Chesapeake & Ohio road, has retired for the present from railroad management, and has taken up his residence in Springfield, Mass.

—Ex-Gov. John B. Page, of Rutland, Vt., President of the Rutland Railroad Company and a claimant of the presidency of the Central Vermont, was married last week, at Winchester, N. H., to Miss Hattie E. Smith. Whatever opinion Governor Page may have of the Smith family as railroad managers, he evidently approves of them from a household point of view. The new Mrs. Page, however, is not related to the St. Albans branch of the family.

—Mr. W. G. Curtis, Assistant Superintendent of the Stockton & Copperopolis and Stockton & Visalia railroads was to be married in St. John's Church, Stockton, Cal., June 15, to Miss Matie E. Burton.

—Mr. Edward P. North, formerly Superintendent of the Houston & Great Northern Railroad, and recently engaged in government harbor works and river improvements north of St. Paul, goes to Milwaukee to take charge of the harbor work north of Milwaukee on the west side of Lake Michigan and south shore of Superior under Major H. M. Robert, of the Corps of Engineers.

—Mr. Gilead A. Smith, the London iron merchant who has failed for $3,000,000 in consequence of break down of the Aberdare Company, is the brother-in-law of Mr. J. Edgar Thomson.

TRAFFIC AND EARNINGS.

Flour and Grain Movement.

Receipts and shipments for the week ending June 5 are reported as follows, flour in barrels and grain in bushels:

Flour:	1875.	1874.	Inc. or Dec.	P. c.
Lake ports' receipts	113,289	132,052	Dec. 18,763	15.7
" " shipments	102,476	110,587	" 8,111	7.4
Atlantic ports' receipts	198,529	212,691	" 14,162	6.7
Wheat:				
Lake ports' receipts	1,229,976	2,237,777	" 1,007,801	45.0
" " shipments	1,590,450	2,631,634	" 1,041,184	40.0
Atlantic ports' receipts	2,107,693	2,020,208	Inc. 87,485	4.3
Grain of all kinds:				
Lake ports' receipts	2,641,087	5,324,137	Dec. 2,683,050	50.2
" " shipment	2,708,906	5,005,175	" 2,236,269	44.7
Atlantic ports' receipts	3,535,213	3,625,060	" 89,647	2.5

Of the lake ports' grain shipments during the week, 40.9 per cent. went by rail this year and 24 per cent. last year, when, however, the rail shipments were a fourth larger than this year.

Of the Buffalo shipments for the same week, 40 per cent. went by rail.

San Francisco wheat shipments for May and for the eleven months of the crop year ending May 31 were as follows (flour being reduced to wheat in the totals):

Month of May:	1875.	1874.	Inc. or Dec.	P. c.
Wheat, bushels	310,167	508,000	Dec. 197,833	39
Flour, barrels	23,200	64,600	Dec. 41,600	64½
Totals, bushels	427,833	817,333	Dec. 389,500	47½
Crop year:	1874-75.	1873-74.		
Wheat, bushels	14,364,667	11,896,500	Inc. 2,468,167	20¾
Flour, barrels	444,400	587,700	Dec. 143,300	24¾
Totals, bushels	16,583,667	14,834,833	Inc. 1,748,834	11¾

The falling off in flour was almost entirely in the exports to Great Britain, the trade with South and Central America, the Pacific islands and China remaining about the same.

At Chicago for the week ending June 12 the receipts were 44,543 barrels of flour and 903,409 bushels of grain of all kinds this year against 36,785 barrels of flour and 1,881,104 bushels of grain last year; an increase of 22 per cent. in flour and a decrease of 54 per cent. in grain. The shipments were 44,116 barrels of flour and 1,895,270 bushels of grain this year and 32,960 barrels of flour and 2,365,983 bushels of grain last year, an increase of 34 per cent. in flour and a decrease of 20 per cent. in grain. The shipments of grain were more than twice as great as the receipts, so that the great stock on hand has at last begun to diminish.

Railroad Earnings.

Earnings have been reported as follows:

Year 1874:	1874.	1873.	Inc. or Dec.	P. c.
Western & Atlantic	$1,344,933	.....	.....	....
Expenses	810,285	.....	.....	....
Net earnings	$534,648	.....	.....	....
Earnings per mile	9,745	.....	.....	....
Per cent. of expenses	60.25	.....	.....	....
Cin., Lafayette & Chicago	$453,717	$381,225	Inc. $72,492	19
Expenses	230,229	185,917	Inc. 44,312	23¾
Net earnings	$223,488	$195,308	Inc. $28,180	14½
Earnings per mile	6,050	5,083	Inc. 967	19
Per cent. of expenses	50.74	48.77	Inc. 1.97	4
Year ending March 31:	1874-75.	1873-74.		
Manchester & Lawrence.	$183,646	$177,083	Inc. $6,563	3¾
Expenses	82,528	76,580	Inc. 5,948	7¾
Net earnings	$101,118	$100,503	Inc. $615	0¾
Earnings per mile	7,063	6,8.1	Inc. 252	3¾
Per cent. of expenses	44.94	43.25	Inc. 1.69	3¾
Four months ending April 30:	1875.	1874.		
Union Pacific	$3,210,015	$2,750,686	Inc. $459,329	16¾
Expenses	1,574,589	1,555,362	Inc. 19,227	1¼
Net earnings	$1,635,426	$1,195,324	Inc. $440,102	36¾
Per cent. of expenses	49.05	56.65	Dec. 7.60	13¾
Month of April:				
Atchison, Topeka & Santa Fe	$112,474	$114,245	Dec. $1,771	1½
Expenses	50,766	47,511	Inc. 3,255	7
Net earnings	$61,708	$66,734	Dec. $5,026	7½
Per cent. of expenses	45.14	41.59	Inc. 3.55	8½
Denver & Rio Grande	32,162	29,673	Inc. 2,489	8½
Expenses	18,029	14,980	Inc. 3,049	20¾
Net earnings	$14,133	$14,693	Dec. $560	3¾
Earnings per mile	268	247	Inc. 21	8½
Per cent. of expenses	56.06	50.48	Inc. 5.58	11
Toledo, Peoria & Warsaw	105,871	94,569	Inc. 11,302	12
Expenses	100,328	.....	.....	....
Net earnings	$5,543	.....	.....	....
Per cent. of expenses	94.76	.....	.....	....
Union Pacific	$1,095,514	$834,955	Inc. $260,859	31¼
Expenses	530,340	453,366	Inc. 76,974	17
Net earnings	$565,474	$381,589	Inc. $183,885	48¼
Per cent. of expenses	48.30	54.29	Dec. 5.99	11
Month of May:				
Baltimore & Ohio	$1,320,494	$1,226,010	Inc. $94,484	7¾
Central Pacific	1,797,000	1,311,698	Inc. 485,302	37
Chi., Dan. & Vincennes.	55,182	41,646	Inc. 13,536	32½
Denver & Rio Grande	35,630	36,243	Dec. 613	1¾
Illinois Central	584,764	621,013	Dec. 36,249	5¾
Ind., Cin. & Lafayette	138,327	144,872	Dec. 6,545	4½
Int. & Great Northern	80,858	70,698	Inc. 10,160	14¾
Kansas Pacific	289,706	316,647	Dec. 26,941	8½
St. Louis, Alt. & T. H.—				
main line.	73,467	91,651	Dec. 18,184	19¾
" " branches	38,980	40,867	Dec. 1,887	4½
St. Louis, Iron Mt. & So.	264,446	244,894	Inc. 19,552	8
Union Pacific	1,214,668	910,065	Inc. 304,603	33½
Tol., Peoria & Warsaw	91,543	93,346	Dec. 1,803	2
Expenses	111,747	.....	.....	....
Deficiency	$20,204	.....	.....	....
Per cent. of expenses	122.07	.....	.....	....
Two weeks ending May 28:				
Great Western	£32,651	£40,078	Dec. £7,427	18½
Two weeks ending May 29:				
Grand Trunk	£69,500	£77,700	Dec. £8,200	10½

The Delaware Fruit Traffic.

The Delaware fruit season has fairly begun, and last week as many as 28 car-loads of strawberries per day were sent up from Delaware and the eastern shore of Maryland, each car carrying about 10,000 quarts.

It is stated that arrangements are being made to forward 300 car-loads daily over the Delaware Railroad during the peach season. This will require the use of about 900 cars. It is also reported that the freight on fruit from the lower Peninsula to New York will be reduced from $102.50 per car, last season's price, to about $70 per car. Taking a car-load at 10 tons, though the actual weight of fruit carried is, we believe, less, the rate of $102.50 per car from Clayton to Jersey City is 6.6 cents per ton per mile. In considering the justice of this rate it must be remembered that it includes the return of the car with the empty packages; that the fruit cars must be specially prepared for the service; that the trains are run at a higher rate of speed than ordinary freight, and that the season is a comparatively short one.

Steamship Rates.

The long continued contest of the New York and Liverpool lines has been settled on a basis which recognizes a difference between the fast and slow lines, the National and Williams & Guion being classed together in the latter. Steerage rates to New York are to be five guineas by the fast lines and not more than 5 per cent. less by the slow ones, making a difference of about $1.50 in favor of the slow lines. Cabin passage rates are to be made by each company to suit itself, as heretofore. Freights from Liverpool to New York are to be 40 shillings per ton for fine goods, 20 shillings for rough goods, 12s. 6d. for weight goods, and 7s. 6d. for crates. Five per cent primage will be allowed to the slow lines and 10 per cent. to the fast ones.

The Anthracite Miners' Strike.

Mr. F. B. Gowen, President of the Philadelphia & Reading, has declined to hold a conference with a delegation from the Miners' Association as to the rate of wages, as he is not a member of the committee of the Coal Exchange on that subject. On the question of tolls and prices of coal he denies the right of the Association to interfere in any manner with the business of the company.

The latest dispatches announce a general weakening of the strike in the Schuylkill region and a partial resumption of work.

In the Wyoming region the Lehigh & Wilkesbarre Company's men have surrendered and have agreed to go to work on the company's terms, which were a reduction of 10 per cent. from the basis of 1874, with an increase of 3 per cent. when the wholesale price of coal at New York reaches $5.25 per ton; 6 per cent. at $5.50; 9 per cent. at $5.75; 12 per cent. at $6. The company employs in all over 10,000 men.

Coal Movement.

Coal tonnages are reported as follows for the week ending June 5:

	1875.	1874.	Inc. or Dec.	P. c.
Anthracite	308,818	432,543	123,725	28⅝
Semi-bituminous, Broad Top and Clearfield	13,031	.....	.....	....
Cumberland	65,568	.....	.....	....
Bituminous, Barclay	6,665	.....	.....	....
" Western Pa.	11,414	.....	.....	....
" West Va.	4,700	.....	.....	....
Coke, Western Pa.	5,498	.....	.....	....

The annual report of the Chesapeake & Ohio Canal gives the following as the tonnage of the canal for the year ending December 31:

	1874.	1873.	Inc. or Dec.	P. c.
Cumberland	770,650	779,008	Dec. 8,358	1¼
Gas coal	65,642	18,497	Inc. 47,145	254¾
Totals	836,292	797,505	Inc. 38,787	4⅞

The number of boats cleared from Cumberland during the season of navigation was 7,378.

The coal traffic of the Pennsylvania Railroad and branches for the fourth week in May was as follows:

Anthracite, tons	30,570
Bituminous	58,629
Coke	15,325
Total	104,524

For the last three days of May the tonnage was: coal, all kinds, 30,643; coke, 5,499; total, 36,142 tons.

The shipments from the Blossburg coal region over the Corning, Cowanesque & Antrim Railroad for May and for the year were as follows:

	1875.	1874.	Decrease.	P. c.
Month of May	54,338	99,115	44,777	45⅛
Five months ending May 31	154,689	.....	.....	....

Lake Traffic.

Wheat from Chicago to Buffalo had been taken within a week at 2⅞ and corn at 2¾ cents per bushel.

OLD AND NEW ROADS.

Baltimore & Ohio.

At a special meeting in Baltimore, June 15, the stockholders voted to approve the agreement heretofore made for the purchase of the interest in the Pittsburgh, Washington & Baltimore road held by the city of Baltimore for $1,000,000. That interest is represented by second-mortgage bonds and unpaid coupons, and amounts to about $2,337,000.

Two additional tracks have been completed from Piedmont to Keyser, W. Va., five miles. At Keyser a very large yard is being laid out and it will be made the great distributing point both for the Cumberland coal traffic and for the cars carrying the western traffic. The yard will be over a mile long and wide enough for 14 side tracks its whole length. A round-house to hold 44 engines has just been completed, and extensive stock yards have also been built.

At the regular monthly meeting of the directors, held June 9, Mr. Garrett made a long address. He said that the earnings of the road for May showed an increase of $94,484, of which $89,056 was derived from the new Chicago Division. The revenue from the Washington Branch showed a decrease of only $3,568, a gratifying result, when it is remembered that the fare between Baltimore and Washington was maintained at the old rate, $1.20, while the Baltimore & Potomac had reduced it to 50 cents. He called attention to the many improvements in progress at Keyser, at Newark, and on the Chicago Division. The shipping business at Baltimore was increasing largely, and plans were being prepared for an additional steamship pier at Locust Point. Attention was called to the exceedingly varied nature of the company's freight traffic.

With respect to the credit of the company, Mr. Garrett mentioned the aid which it had extended to the Marietta & Cincinnati and the Connellsville Companies. By that aid the floating debt of those roads had been paid off and they had been relieved from all embarrassments. The Marietta & Cincinnati had been enabled to complete the important works in progress for improving its line, and for extending it into Cincinnati. The credit of the Baltimore & Ohio had been assailed in every possible way; it had been asserted that its paper was flooding the New York money market, when in fact large loans had been offered at low rates of interest and declined, the company not needing the money.

Mr. Garrett said, as the result of a personal examination, that the Company's lines were all in most excellent condition. He referred to the opposition encountered at various points while the Chicago Division was in progress, and to devices resorted to in order to prevent it from securing depot accommodations in Chicago. He also referred to the trouble about sending the postal cars through to New York and said that the only result had been to give the people of Baltimore a new accommodation in the form of an additional double daily line of postal cars to Washington. He also referred to the continuance of the regular dividends and to the gratifying increase of the surplus fund, showing the careful and economical management of the company and its sound financial condition.

Auction Sales of Railroad Securities.

At auction in New York, June 9, the following prices were obtained: Paterson & Hudson River stock, dividends guaranteed by the Erie, 97 to 100¼; Paterson & Ramapo stock, dividends guaranteed by the Erie, 77½ to 86¼; Toledo, Wabash & Western preferred, 11; St. Paul & Pacific first mortgage, 37¼; Iowa Midland first mortgage, guaranteed by Chicago & Northwestern, 79 to 80; Winona & St. Peter first mortgage, guaranteed by Chicago & Northwestern, 80.

The Railroad War.

At the meeting in Baltimore, June 16, the Baltimore & Ohio directors ratified the compromise agreement with a slight amendment which, it was believed, would be acceptable to the Pennsylvania board.

A Philadelphia dispatch of the same date says: "It is understood that the agreement between the Pennsylvania and Baltimore & Ohio Railroad Companies is for a period of ten years, the companies to agree upon moderate rates between all competing points, which will be maintained by both.

"The contract can only be terminated by resolution of the respective boards. A special committee is to be appointed by each board, to whom shall be referred all matters of difference, if any, that may arise relative to the practical working of the

arrangement, and with power to adjust all complaints between the two companies.

"The Pennsylvania Railroad Company opens its lines between Philadelphia and New York to the Baltimore & Ohio Railroad on the same terms that it gives other connecting roads at Philadelphia.

"This agreement, it is believed, will be of a permanent character. It is understood the details of the agreement will not be published."

It is said that the credit of bringing about a final agreement was largely due to Mr. Anthony J. Drexel, of the banking house of Drexel & Co., who is a personal friend of Mr. Garrett and Mr. Scott, and whose banking house has intimate business relations with both companies.

The Pennsylvania board at its meeting June 16, also ratified the agreement.

Hannibal & St. Joseph.

The Missouri Supreme Court has just given its decision in the suit of the State against this company, to recover taxes due for 1872. The company resisted payment on the ground that the taxes were assessed by the special board of equalization and in a manner different from that provided in its charter. The lower court sustained the company and the State appealed. The Supreme Court now reverses the previous judgment and decides in favor of the State. It is held that the assessment of taxes by the new board is only different from the method laid down in the charter in form and the difference is not sufficient to make a breach of contract. Should an excessive valuation be put upon the property, an appropriate remedy is provided.

Red River Valley.

This company has filed articles of association in Minnesota. Its purpose is to build a line from Breckenridge, Minn., northward down the Red River to Glyndon, with such branch lines as may be decided on. The capital stock is to be $500,000, and the corporators are all connected with the St. Paul & Pacific.

Pittsburgh, Cincinnati & St. Louis.

In the United States Circuit Court in Chicago, Mr. Martin Andrews has brought suit to recover arrears of interest on $147,000 third-mortgage bonds of the old Steubenville & Indiana Company, afterwards merged in this company. Mr. Andrews alleges that when the Steubenville & Indiana was reorganized he agreed to accept new bonds for his old ones and stock for the overdue coupons. The exchange of bonds was made, but he has never received the stock as agreed, and hence brings suit to recover.

Chicago, Danville & Vincennes.

In the United States Circuit Court in Chicago, June 11, a motion was made to consolidate the foreclosure suit begun by Stephen Osgood and others with that begun by the trustees, Messrs. Fosdick and Fish. The Osgood suit is that originally begun in the State Court and subsequently transferred. The matter was postponed to June 18.

A Proposed Southern Railroad Agreement.

A circular has been issued addressed to Southern railroad managers which urges upon them the necessity of doing something to remedy the evils brought about by the excessive competition of the various Southern lines, which has already thrown a number of companies into bankruptcy, and threatens to ruin more. The circular, to which no names are appended, covers a proposed form of agreement which is, briefly, as follows:

1. The formation of a convention of one representative of each road, which shall elect three Commissioners and prescribe their duties and compensation.

2. The Commissioners to establish through rates between competing points, to determine prorating distances to be allowed water lines, percentages to be allowed, arbitrary charges for terminal expenses, transfers, etc., and to have a general supervision of all business.

3. Officers of companies violating the rules and underbidding on rates shall be punished as the Commissioners may decide.

4. Commissioners to have a general office in some city where one of them shall reside, and to be authorized to employ clerks.

5. They are to co-operate with other Eastern and Western bodies when required.

6. Companies to agree to exact established rates from connecting lines and to accept no lower rates than those agreed on. Through business to be cut off, as far as possible, from any line violating the agreement.

7. The Commissioners to have authority to abolish all outside agencies and to establish an agent wherever they may deem best.

8. Each company may protect its local traffic from competing lines, by charging local rates to competing points.

9. All existing contracts to be submitted to the Commission.

10. In case of disagreement by the Commission a reference may be made to the Convention, and a decision of the majority of that body shall be final.

11. Vacancies in the Commission to be filled by the Convention.

12. Agreement to be modified by a two-thirds vote of the Convention.

13. Companies refusing to join to be refused recognition as far as possible.

14. The number of votes to be cast by each company in convention to be determined by the miles of prorating distance it represents.

It is suggested that companies willing to join in a call for a convention write to some prominent railroad man, and Col. L. P. Grant, of Atlanta, is named as a suitable person.

Erie.

The Farmers' Loan & Trust Company of New York, as trustee under certain mortgages, has filed an answer in the Erie suit, setting forth its interest in the proceedings as such trustee. The Court made an order extending the receivership to cover the trusts represented. Similar orders have been granted on application of the trustees under the fifth and supplemental mortgages.

The order appointing Mr. Jewett Receiver in New Jersey specifies that nothing in it shall be construed to impair the right of the State authorities to enforce the payment of the taxes now due and unpaid. It is also provided that any person or corporation having a contract with the company may file an independent bill in the suit, and, if entitled thereto, may receive such relief by injunction or otherwise as the case may require.

Atlantic & Great Western.

Mr. James McHenry's plan of reorganization was accompanied by a short circular to the holders of securities, urging the merits of his plan and setting forth the improved prospects of the road under a stable management and with a changed gauge. Mr. McHenry says that he has finally abandoned his long cherished policy of a close alliance with the Erie, owing mainly to the fact that he finds it impossible to make any contract which will bind that company.

Mr. James B. Hodgskin, formerly Treasurer, and at one time General Manager of this company, has written and published a letter with reference to the charges of misrepresentation which were contained or at least implied in that portion of Mr. Jewett's late report which referred to the lease of this road by the Erie. Mr. Hodgskin, while admitting that Mr. McHenry, in London, persistently misrepresented the amount of the net earnings of the road in spite of a protest from the American directors, insists that a full and fair statement was made to the officers of the Erie, and that he himself placed in President Watson's hands a complete statement taken from the Auditor's books.

Mr. Hodgskin says that the lease was not advocated by the directors of the Atlantic & Great Western, and that the general policy of that company and many of the acts leading to its second bankruptcy were forced upon it by the Erie, the purchases of Cleveland, Columbus, Cincinnati & Indianapolis stock being instanced.

Mr. Hodgskin, in his connection with the Atlantic & Great Western and the United States Rolling Stock Company, has been known as a capable and honest officer, and his words are entitled to consideration.

Boston & Albany.

Extensive arrangements have been made to accommodate the enormous passenger traffic to and from Boston on the day of the Bunker Hill Centennial, which was to take place June 17. A large number of cars were borrowed from connecting lines; the Boston yard was entirely cleared of freight cars, and no freight trains were to be run east of Worcester on that day. Arrangements had been made to dispatch passenger trains from Boston in the evening as fast as they could be filled, every available car and engine being in readiness. At the recent celebrations at Concord and Lexington, the railroads failed entirely to accommodate the travel, and the Boston & Albany people have taken all possible steps to avoid a similar trouble.

Missouri Railroad Law.

The Missouri Railroad Commissioners have issued a circular calling attention to the provisions of the law and to their purpose of enforcing it. The rates on passenger travel and on the seven special classes of freight specified in the body of the law are fixed by the law itself, as heretofore noted. The rates on the four general classes of freight were left to the discretion of the Commissioners, and they give notice that they have decided to allow no rates higher than those which were in force on the respective roads March 29, 1875.

It is understood that most if not all of the companies will contest the enforcement of the law.

Meetings.

The following companies will hold their annual meetings at the times and places given:

Michigan Central, in Detroit, Mich., June 28.

Erie, at the office in New York, July 13, at 10 a. m.

Dividends.

Dividends have been declared by the following companies:

New York Central & Hudson River, 2 per cent., quarterly, payable July 15.

New York & Harlem (leased by New York Central & Hudson River), 4 per cent., semi-annual, payable July 1.

Western Union Telegraph, 2 per cent., quarterly, payable July 15.

American Express, $3 per share, semi-annual, payable July 15.

Wells, Fargo & Co. Express, 4 per cent, semi-annual, payable July 15.

Central Ohio (leased by Baltimore & Ohio), 3 per cent., semi-annual, payable June 23.

Fitchburg, 4 per cent., semi-annual, payable July 1.

The Proposed Conference of Railroad Commissioners.

The Illinois Railroad Commissioners have approved of the call for a general meeting of all the railroad commissioners of the United States.

Memphis & Little Rock.

The property known as the navy-yard property in Memphis, Tenn., having been sold, notice is given to all holders of bonds of this company secured on that property that they must file and prove their claims on or before July 10, with Edmund A. Cole, Clerk of the First Chancery Court at Memphis, Tenn. Failing to do so they will be barred from all share in the proceeds of the sale.

Yardmaster's Mutual Benefit Association.

The first annual convention was held in Buffalo, N. Y., June 9 and lasted three days. The association was reported in a flourishing condition, with a membership of 131, which is rapidly increasing. The convention transacted a large amount of routine business and made some amendments to the constitution. The proceedings were pleasantly closed by an excursion to Niagara Falls and a dinner.

Tyler Tap.

A force of 200 men is now at work on the grading of this road and are expected to have 10 miles out from Tyler, Tex., completed shortly.

Illinois Railroad Taxation.

The Attorney-General has taken a power of attorney from the twenty collectors of counties along the Chicago & Alton road to sign appeal bonds to the United States Supreme Court in case the Federal court should decide the pending tax cases against the collectors. The hearing on the injunction will be this month in the Rockford, Rock Island & St. Louis railroad case. The hearing of the contempt case of Sheriff Bridges, for levying on a train at White Hall, was to come on at Chicago on the 15th, and the Attorney-General was to argue for the collector in person. The Green County board has passed an order to Collector Bridges to follow up the cases against both railroads even to the United States Supreme Court, if advised by the Attorney-General, and the county would assume all liability and expense.

The New York Classification Bill.

Governor Tilden has approved the bill passed by the New York Legislature which provides for the classification of directors and the election of a part only of the board each year, provided stockholders decide so to do. It also allows New York companies to hold and work coal lands in other States, and repeals the law which prohibits any director or officer of the New York Central & Hudson River or the New York & Harlem from becoming a director or officer of the Erie.

Chesapeake & Ohio.

It is reported that at this present time a bill for foreclosure has been drawn and an application for a Receiver, and that is now in Richmond, to be used upon telegrams to a lawyer there.

It is also reported that there is much discontent among bondholders, and that many of them would support and approve such action.

St. Louis, Iron Mountain & Southern.

In the case of Chouteau against Allen the Missouri Circuit Court has decided in favor of this company and Mr. Thomas Allen, a case affecting a large body of land in Southern Missouri. The lands are part of the grant made to the original Cairo & Fulton Company, which was sold out by the State in 1866. Just before the war Gen. Mason Braynan, then President of that company, prepared bonds for issue to contractors These bonds, it was claimed, were never really issued, but were scattered or stolen during the first military operations in Missouri. A number of them came into the hands of Mr. Chouteau and others, who sued to enforce a lien on the land grant. The Court has now decided against the validity of the old bonds. The lands affected by the suit were over 400,000 acres.

Tennessee & Pacific.

The Wilson (Tenn.) County Court has appointed an attorney to make a thorough investigation of the affairs of the company, and also into the legality of the county bonds issued to the road.

The last installment, $150,000, of the purchase money due the State must be paid in August. The Governor has intimated that he will take immediate steps to foreclose, unless the amount is punctually paid.

New York, West Shore & Chicago.

The New York Supreme Court having appointed Livingston Lansing Receiver, he gives notice that proof of all outstanding debts, and also copies of all contracts yet unfulfilled, must be lodged with him at the office of Emott, Burnett & Hammond, No. 120 Broadway, New York, on or before August 5.

Waynesburg & Washington.

This company advertises for proposals for grading the road from Waynesburg, Pa., to Washington.

Memphis & Knoxville.

At a recent meeting the directors of this company authorized the Executive Committee to let the grading of the road between Pulaski, Tenn., to Lawrenceburg, also from Pulaski to Fayetteville, and from Lawrenceburg to Henderson, as soon as the subscriptions along the line reach an amount sufficient to pay for the grading and bridging. The President was also instructed to ask a subscription from Wayne County.

Kansas City & Memphis.

The resumption of work on this road has been delayed by a suit brought by John O'Day and H. C. Young, former contractors, to recover balances due them for work done upon the road.

Corning, Cowanesque & Antrim.

It is reported that the Fall Brook Coal Company, which owns this road, will extend it from Corning, N. Y., northward to the New York Central at Geneva.

Lexington & St. Louis.

In the suit of H. B. Hamilton, Assignee in Bankruptcy of this company, against the Pacific, of Missouri, and the Atlantic & Pacific companies, Messrs. H. Flanagan and Louis Schmidt, Masters in Chancery appointed by the United States District Court, have been taking testimony. The suit grows out of a contract made by the Missouri Pacific Company with the Lexington & St. Louis in 1870, by which the former agreed to iron the road-bed, build depots, bridges, etc., and equip the road 52 miles long, and in consideration thereof the Pacific Company was to have a lease of the Lexington & St. Louis Railroad for a term of 30 years, and to receive $910,000 stock of the latter road.

Aside from the large amount of stock involved, the Masters in Chancery will also report upon claims upon the Missouri Pacific Railroad for a certain per cent. of the earnings of the said Lexington Branch, while being operated under the lease. The case presents several complex law points, and both parties are represented by attorneys.

Vermont & Canada.

The temporary injunction heretofore granted restrains the directors from distributing to the stockholders the new bonds received from the Central Vermont Company in payment for the road, unless the Vermont & Canada Company shall proceed to make good its guarantee on the 8 per cent. bonds of the Vermont Central. The suit was brought by some holders of those bonds, and a further hearing was to have been had this week. It is said that the Central Vermont has not made the interest payment due June 1, the excuse being this injunction.

Fond du Lac, Amboy & Peoria.

A company known as the Fond du Lac & Whitewater has been consolidated with this and the necessary papers have been filed. The capital stock is to be $2,000,000; the road to be built, from Fond du Lac, Wis., to Peoria, Ill., with branches to Milwaukee and Chicago.

United States Rolling Stock Company.

This company has decided to locate shops at Urbana, O., 50 acres of land having been donated by citizens of that place. A large storage yard is to be laid out and built at once, for the keeping of cars and engines.

Pacific Mail.

A meeting of the directors was held in New York, June 12, when the question of raising sufficient funds to meet maturing installments of $1,150,000 to be paid on the three iron steamers now in course of building, as well as to settle the Panama loan of $500,000, was discussed at considerable length. The matter was ultimately referred to the Executive Committee with full power.

Northern Pacific.

A Washington dispatch, dated June 14, says: "A meeting of the bondholders of the Northern Pacific Railroad was held this afternoon, and was presided over by Dr. J. E. Snodgrass. The feeling seemed to be opposed to the proposition of the Livingston Committee, and in favor of such a modification of Judge Blatchford's order for the sale and distribution as shall be more favorable to the bondholders. Final action will be taken on Friday evening. The meeting to-day was large in number and representation in bonds."

Western & Atlantic.

In a letter to an Augusta (Ga.) paper Mr. E. W. Cole, President of the Nashville, Chattanooga & St. Louis Company, says that the net balance remaining to the lessees of this road last year, after paying the rental ($300,000) to the State of Georgia, was $234,647.86. Of this sum $92,000 was paid on the coupons of the income bonds, and the balance was applied to the payment of the indebtedness of the company, which was incurred for equipment and construction during the first three years of the lease. The company is still in debt about $130,000. As the charter made no provision for stocking the lease, but simply divided it into shares, the income bonds were issued to stand in the place of stock, with no security for the payment of either principal or interest, unless the money was made out of the income of the road. Not a dollar was paid to any stockholder for the first three years of the lease, and the money was borrowed with which the coupons were paid the fourth year. In other words, the company was indebted over $130,000 for borrowed money to equip and repair the road when it paid $92,000 of the coupons on the income bonds. If it had paid debts for borrowed money before it paid the amount of coupons above mentioned, not a dollar would have been received by any lessee the fourth year of the lease, and the debt at the beginning of the fifth year would have been about $40,000. But, as the lessees were impatient to realize something, it was decided to carry the debt of over $130,000 and pay the $92,000 on income bonds. This is the whole amount paid to the lessees for the first four years, and is just $1,000 per annum for each of the 23 shares into which the lease was divided.

St. Paul & Pacific.

Our Amsterdam correspondent writes: "At St. Paul the bonds of the Main Line and of the issue of 1869 can be sold at more than double the price for which they can be bought here, for the reason that they can be given at par in payment for lands, though the certificates issued by the committee cannot. Mr. Reed, of the First National Bank of St. Paul came here last year and wished to buy a hundred of them, but the quantity floating is not so large that you can buy them at once,

They need to be bought slowly and continuously, and can give American importers an enormous profit.

"Likewise the St. Vincent and Brainerd Extension bonds of this company must yield buyers a large profit. The price of the 7 per cent. mortgage bonds is about 7 here, though a new company to be incorporated in Minnesota offered $3,000,000 cash for the road as it is, while the issue of bonds is $10,000,000, and their value after deducting the floating debt will be more than 30 per cent."

Denver & Rio Grande.

Writing from Amsterdam on the 30th of May a correspondent says: "Denver & Rio Grande 7 per cent. bonds reacted from 50 to 45½. A company is incorporated in Paris selling these bonds at prices much higher than these quotations, but guaranteeing the payment of coupons *on the bonds bought from them*. This scheme (not including the bonds sold on the Stock Exchange) the knowledge that the paid in capital of this company is only one million francs, and, most of all, the fact that President Palmer had not for some months since published any announcement of the usual deposit for the payment of coupons, caused these bonds to fall faster and faster day after day."

New Haven, Middletown & Willimantic.

A meeting of the first-mortgage bondholders is to be held in Middletown, Conn., June 24, at 2 p. m., to complete the organization of the Boston & New York Air Line Railroad Company, which has just been chartered by the Connecticut Legislature to take this road.

Gilman, Clinton & Springfield.

The annual meeting was announced to take place in Springfield, Ill., June 8, and on the morning of that day a number of private stockholders, owning 4,020 shares, assembled and elected a full board, notwithstanding the fact that the board elected last year was classified, in accordance with the law, to serve one, two and three years. An injunction was served on the Morgan Improvement Company and its representatives to prevent them from voting on the 14,000 shares owned by that company. The validity of that stock is in question in the suit now pending in the Illinois Supreme Court, and the action of that court will probably decide whether the action of the stockholders at this election is valid.

Davenport & St. Paul.

Mr. A. C. Fulton, of Davenport, Ia., has offered to build the extension of this road from Pine Hill into the city of Davenport for $144,287, the estimate to cover everything, including right of way.

New York & Long Branch.

The track is laid to Long Branch, and a train has passed over the whole road. The ballasting and trimming up is being rapidly completed, and trains will begin to run regularly about June 20, or shortly afterwards.

The new road leaves the Central Railroad of New Jersey at Elizabethport, 10¼ miles from Jersey City, and then runs a little west of south, 12 miles, to Perth Amboy, where it crosses the Raritan River on a bridge which has been the subject of much litigation and delay to the construction of the road. After crossing the river to South Amboy it takes a sharp turn and runs east by south through Middletown and Red Bank to Long Branch. It is 34 miles long, making the whole distance from Jersey City to Long Branch 44¼ miles, or some 13 miles longer than the old route by steamboat to Sandy Hook and thence by New Jersey Southern to Long Branch. The new line will doubtless secure a share of the very large summer travel between New York and Long Branch, although most people will probably continue to prefer the old route with its large proportion of steamboat travel. There is not likely to be any very sharp competition, and the two lines will probably work harmoniously, the more so as ex-Chancellor Williamson, of New Jersey, who is trustee in possession of the New Jersey Southern, is also a director of the Central of New Jersey, which company leases and operates the new line.

The bridge over the Raritan River, which was built by the Keystone Bridge Company, has a draw-span 427 feet long, giving two clear openings of two hundred feet each. This large opening was made necessary by the peculiar commerce of the Raritan, which is in large part made up of tows of canal boats from the Delaware & Raritan Canal.

Syracuse Northern.

The Oswego (N. Y.) *Palladium* says: "In the Supreme Court, special term, held here June 8, Hon. George N. Kennedy, of Syracuse, in behalf of the Rome, Watertown & Ogdensburg Railroad Company, judgment creditors (by default, execution returned unsatisfied), made a motion for the appointment of a receiver for the Syracuse Northern Railroad. Attorney General Pratt, in behalf of the city of Syracuse and other stockholders, resisted the motion. The unsatisfied execution and alleged insolvency of the company were the main grounds of the application and the resistance was based mainly on allegations of fraud and collusion on the part of the directors, such as were raised before Judge Hardin in September last, when he carefully examined the subject and granted an order allowing the city of Syracuse and the towns, as stockholders, to become parties in defense in the suit for mortgage foreclosure which has been tried at great length before Hon. Albertus Perry, referee in this city. Judge Hardin ruled that the stockholders should be heard in the matter and gave an order for a hearing at Lowville next week."

Milwaukee & Northern.

The Milwaukee *News* says: "The Milwaukee & Northern and the Wisconsin Central companies have executed a supplementary agreement, ending all controversies that have arisen under the lease of the Milwaukee & Northern to the Wisconsin Central. The settlement is made with the sanction of the trustees of the Northern Company's bonds and insures the possession of the line by the Central Company."

Eastern Shore.

A meeting of the first-mortgage bondholders was held in Philadelphia, June 9, when Hon. George R. Dennis presented a report. The operations of the road from December 1, 1869, to April 30, 1875, five years and five months, were:

Earnings ($11,682 per mile)	$443,905.37
Expenses (67.76 per cent.)	300,779.48
Net earnings ($3,766 per mile)	$143,125.89

The net earnings had been used to pay debts incurred, leaving a balance on hand, April 30, of $6,816.20. The receipts last year were $21,593.64 less than the previous year, which was occasioned by loss of through freight from Norfolk and the failure of the fruit crop. The prospects this year are better. During the last ten days over 300 car-loads of strawberries passed over the road, and a fine peach business is anticipated. The hotel on the Atlantic coast, in Worcester County, Md., has been completed, and will be ready to accommodate 250 guests by July 1. Arrangements are being made to construct a bridge 250 yards in length across the Narrows, so that passengers will be landed at the hotel on the beach. As the beach is equal to any other on the Atlantic coast and the surf-bathing fine, it is expected it will increase the passenger travel over the road. Arrangements have been made by the Eastern Shore Railway, the Eastern Shore Steamboat Company, and the Wicomico & Pocomoke Railroad, for a direct line from Baltimore.

About $31,923.29 have been paid in the last five years for the use of cars, and the report recommended the purchase of cars for the road. There is $5,251.54 due on the floating debt of the company, which has been arranged by notes payable in 1876 and 1877. There is another amount of $2,154.83 outstanding, $30,000 due the Philadelphia, Wilmington & Baltimore Railroad Company and $216,000 overdue coupons on $400,000 first-mortgage bonds up to January 1, 1875.

The report was approved, and a committee was appointed to purchase 40 additional cars for the road.

The Railroad War.

A conference was held in New York, June 11, between Messrs. Scott, Cassatt and Green, of the Pennsylvania, and Vice-President King, of the Baltimore & Ohio. The session lasted through the greater part of the day, and was, of course, private, though it was understood that the differences between the two companies were being discussed. After the meeting Mr. King authorized this statement to be made:

"Executive officers of the Baltimore & Ohio and the Pennsylvania Railroad companies have been in session in New York to-day discussing the points of difference, actual or supposed, between their respective companies. The meeting has been most harmonious, and a basis for a permanent arrangement between the companies will be submitted to their respective boards of directors within the next ten days."

Mr. King said that they had decided, out of courtesy, not to communicate anything further in regard to the results of the conference until after the directors of the companies had taken action in the matter. As to what their action would be he could not, he said, state what twenty or thirty men would decide upon, but he had no hesitation in saying that he thought they would approve of the arrangement proposed by himself and the gentlemen representing the Pennsylvania Railroad.

Mr. Scott also made a similar statement, to the effect that a basis had been agreed upon, but could not be made public until the boards of directors of both companies had passed upon it. It is not known with which party the invitation to a conference originated.

It is said that the agreement provides for the maintaining of uniform rates and for the use of the Pennsylvania line to New York by the Baltimore & Ohio on the same terms as formerly; and for a committee from each board to have general supervision of all complaints made of violation of the agreements. The directors of both companies were to hold special meetings, June 16, to vote on the agreement. The text of it was to be made public afterwards.

Baltimore & Drum Point.

At the annual meeting in Baltimore, June 2, the President reported that the total receipts had been $194,159, all of which had been expended. There are unpaid subscriptions amounting to $658,480, of which it is believed $513,480 are good. The Annapolis & Elk Ridge Company can add $100,000 to this. The county boards of Calvert and Anne Arundel have thus far refused to make the subscriptions which have been authorized by popular vote. It is proposed to use the available assets in completing the line from the crossing of the Annapolis & Elk Ridge road to Mount Zion, or the Calvert County line. The estimated cost of the whole road is $1,300,000.

Springfield & New London.

The contract for the construction of this road from Alden street, in Springfield, Mass., to the Connecticut State line in Longmeadow, 5.7 miles, has been let to Birnie & Warren, of Springfield, Mass., for $100,000, cash, the work to be finished by October 1. The work includes the laying of the main line with steel rails, the necessary sidings, and an iron bridge over the Water-shops Pond, and the price is $17,544 per mile. Bids were received from over 60 contractors.

New York, New Haven & Hartford.

Mr. Goodwin, of East Hartford, who has made himself somewhat prominent by his opposition to the present management, is not satisfied with the refusal of the Railroad Commissioners to inquire into the truth of the charges made by him, and has been urging upon the Railroad Committee the expediency of recommending to the Connecticut Legislature that an investigation be ordered. His principal charges are that the stock was watered at the time of the consolidation, and that the annual reports do not correctly show the condition and business of the company. President Bishop has had a hearing before the Committee also and denies the charges.

Baltimore & Potomac.

The directors have ordered work to be begun on a second track from Baltimore to Washington.

Vermont Central.

In St. Albans, Vt., June 10, before Chancellor Royce, the trustees under the first and second mortgages presented petitions for leave to sell the road to the Central Vermont Company, and the latter asked leave to buy it. In case these petitions could not be granted, then the trustees asked that the trust might be closed out, and the property of the old Vermont Central Company sold to pay its debts. After hearing arguments from representatives of the trustees, the Vermont & Canada, and the Page and Smith boards of the Central Vermont, the hearing was adjourned.

The trustees of the second mortgage have heretofore advertised the Vermont Central road for sale at auction, June 22, but it is believed that this sale will not take place. Probably nothing definite will be done until a decision is reached as to which of the two contesting boards of the Central Vermont is the legal one.

Nevada County.

The contract for the tunnel through Town Talk Ridge, between Grass Valley and Nevada, Cal., has been let to John Burns, who has already begun work.

Stockton & Ione.

A new contract for the construction of this road has been let to Mr. Toomey, who has made arrangements to begin work at once.

Petaluma & San Rafael.

This company has so far completed its arrangements that it has been advertising for bids for the construction of the tunnel through the Puerto Suello north of San Rafael, Cal. Four bids were received, but the award has not yet been made. The tunnel will be 1,100 feet long.

Lake Tahoe.

The grading of this narrow-gauge road is nearly finished, and the rails, which are of steel, are being received at Carson, Nev. From that point they have to be carried some distance in wagons.

Chicago, Burlington & Quincy.

The total number of men employed in the locomotive department are: Aurora, 586; Galesburg, 447; Burlington, 364; Creston, 371; total, 1,768.

Mansfield & Framingham.

The stockholders of this company have approved and ratified an agreement of consolidation with the Boston, Clinton & Fitchburg. The latter company has also ratified the agreement, and arrangements are being made to complete it by issuing the new stock of the consolidated company to the shareholders.

The Mansfield & Framingham road runs from South Framingham, Mass., south by east to Mansfield, 21¼ miles, and is extended from the latter town to New Bedford by the New Bedford Railroad. It was built in the interest of the Boston, Clinton & Fitchburg and has always been worked by that company under lease. At the close of the last fiscal year the capital stock was $301,580; funded debt, $470,000; floating debt, $68,000. The annual interest charge was $1,628 per mile, and the net earnings for that year were not reported separately from those of the lessee, but the gross earnings were $9,166 per mile. The Boston, Clinton & Fitchburg Company owned $125,000 of the stock.

Oregon Central.

There is now a serious dissension among the stockholders, which will probably lead to a long litigation. At the time of the annual meeting in Portland, Oregon, May 27, two meetings were held, one by the Holladay party, the other by the dissenters, who claim to hold a majority of the stock. The present officers, who adhere to the Holladay party, retain possession of the road. Subsequently Mr. Gaston, the President elected by the dissenting party, applied to the Circuit Court and obtained a temporary injunction restraining the old officers from interfering with him or hindering him from taking charge of the road. The old officers, however, retained possession of the road, the injunction not having been served on them.

Later, a cross-bill was filed by the Holladay directors, they alleging that the opposition party excluded a majority of the stock from voting and so elected themselves. Another injunction was then granted, restraining the opposition from interfering with the Holladay party. Both parties are now enjoined and the matter will remain as it is until a hearing has been had in Court and a decision reached, the Holladay party retaining possession of the property.

Philadelphia & Reading.

The Quarryville Branch of the Lancaster & Reading road, recently completed and leased by this company, is run as an extension of the old Lancaster Branch, the whole being now known as the Lancaster & Quarryville Branch. The stations on the new line, with the distances from Lancaster, are: King street, 1 mile; West Willow, 5¾; New Providence, 12¼; Cabeen's Branch, 12¾; Quarryville, 15¼.

Reports come from Philadelphia that this company will either pass or reduce its usual quarterly dividend of 2½ per cent., the cause being the great reduction in traffic resulting from the miners' strike.

Central Pacific.

The trains of the Visalia Division, which includes the San Joaquin Valley Division of the Southern Pacific (that division being leased by the Central Pacific), now run to Caliente, Cal., which is 96 miles from the terminus of the Visalia Division proper, 242 miles southeast from the junction with the Central Pacific main line at Lathrop, and 324 miles from San Francisco. As before noted, Caliente is at the entrance to the Tehachepi Pass, and will be the terminus for some time.

Little Rock & Fort Smith.

Trains are now running through to the new terminus at Altus, Ark., which is 19 miles beyond the old terminus at Clarksville and 120 miles from the eastern terminus at Argenta, opposite Little Rock.

Oil Creek & Allegheny River.

In view of the recent proceedings in the Pennsylvania Supreme Court, a meeting was held in Philadelphia recently at which the committee of bondholders and their counsel and the counsel for the trustees under the mortgage were present. It appeared to be the general opinion that the agreement under which the foreclosure was to be had was still binding upon all parties.

It is understood that a bill in equity to foreclose the mortgage will be filed in the United States Circuit Court. The foreclosure will be completed and the agreement heretofore made by the bondholders, stockholders and creditors will be carried out.

The Supreme Court decided against the validity of the former foreclosure, and ordered the decree to be set aside.

Salisbury & Baltimore.

This company has been reorganized as the Salisbury Railroad Company, and it is expected that work will soon be recommenced and pushed forward to completion. The road is located and partly graded from Salisbury, Pa., northward to the Pittsburgh, Washington & Baltimore at Meyersdale and is intended to serve a large coal region. It will be about eight miles long.

Chicago & Pacific.

The matter of the grade crossing of the Chicago & Northwestern at Elgin came up again in the United States Circuit Court in Chicago, June 10, on a motion for an order to compel this company to make arrangements at once for building an overhead crossing. It will be remembered that after having a report made by Mr. Warren Colburn last fall the Court authorized the use of a grade crossing as a temporary expedient until this spring. Meanwhile the Chicago & Pacific has filed an answer to the original complaint in the suit. The Court gave that company until July 5 to produce testimony and will then make a personal inspection of the crossing.

Chicago, Milwaukee & St. Paul.

As seems to have been generally expected, the Mitchell party was entirely successful at the late annual meeting June 12. The new law authorizing the election of a full board instead of one-third of the board each year was accepted, and a board chosen from which Mr. Sage and his especial friends are dropped.

St. Louis, Kansas City & Northern.

At a meeting between representatives of this company and the Union and Kansas Pacific, held June 12, arrangements were finally completed for a traffic agreement and the formation of a through line to St. Louis for Pacific traffic, by way of the Kansas Pacific and this road. The arrangement will, it is said, go into effect very soon.

Toledo, Peoria & Warsaw.

The Court has authorized the Receiver to build five new station houses at a cost of $1,000 each; to settle claims against the road for damages from accident, amounting to $4,500; to contract for the use of a new line for the Burlington Branch, from Iowa City, Ill., to Burlington, Ia., about 10 miles, where a track belonging to the Chicago, Burlington & Quincy is now used. An allowance of $3,000 for his services was made to the Receiver.

The Receiver has reported as follows his operations for April and May:

Cash on hand April 1		$65,308 28
Receipts of road for April		105,871 29
" " " May		91,543 37
Total		$262,722 94
Expenses for April	$100,328 35	
" " May	111,747 29	
		212,075 64
Balance on hand June 1		$50,647 30

The net earnings in April were $5,542.94; deficiency in May, $20,203.92; total deficiency for the two months, $14,660.98.

Danville, Hazleton & Wilkesbarre.

A meeting of the bondholders was held recently, and, after discussion, the matter of receivership was postponed, and a plan of reorganization suggested by which the stockholders are to agree to elect bondholders as directors and President, the present officers are to resign, and the new board is to pay the debt due to the Pennsylvania Railroad, and then manage the reorganized company for the benefit of the bondholders and stockholders. At the meeting it was urged that if suit were made against the Pennsylvania Railroad Company for their refusal

to pay the interest on the bonds, the decision would be in favor of the Danville, Hazleton & Wilkesbarre Company. That company claims that in Mr. J. Edgar Thomson's lifetime he agreed to pay the interest on these bonds for 33 years, but that, owing to the receipts of the road being less than was anticipated, the Pennsylvania Railroad Company declined to meet these payments.

Rutland.

A bridge, 160 feet long, at Ferrisburg Center, Vt., was destroyed by fire June 14, making it necessary to transfer passengers for several days until the break could be repaired.

New Mail Route.

An extension of mail service has been ordered over the Chicago & Pacific road from Elgin, Ill., to Byron, 52 miles.

West End Narrow Gauge.

This road (formerly the St. Louis & Florissant) is now completed from Grand avenue, in St. Louis, westward seven miles, and will shortly be opened for business. It is graded 10 miles further, to Florissant. It is of 3 feet gauge, and intended for suburban travel.

Chicago & Northwestern.

It is said that at the recent meeting in Chicago, the stockholders voted to authorize the issue of $10,000,000 new bonds, convertible into stock, this issue to be made by the directors at their discretion, and provided they should not be restrained by law from making it.

Illinois Central.

It is said that negotiations are in progress for a pooling arrangement on all competing business with the Chicago & Alton Company.

Alabama & Chattanooga.

A new order in the case appoints Mr. Philip Phillips, of Washington, a special Commissioner of the Court with power to examine into the matters to which exception has been taken. Mr. Carpenter is continued as Receiver, with increased powers. All objections are withdrawn and the proposed settlement confirmed. The sale is conditional.

Indianapolis, Bloomington & Western.

The Receiver has advertised for bids for furnishing the company with 3,000 tons of steel rails.

Cumberland & Ohio.

At the annual meeting in Louisville, Ky., June 21 the President presented a very full report on the present condition of the road. The stockholders voted to authorize an issue of $325,000 7 per cent., 30-year bonds to be secured by mortgage on the section of 30.8 miles, from Lebanon, Ky., to Greensburg, the proceeds to be used in completing and equipping that section. A partial, sectional mortgage is to be made, because it is not deemed advisable to execute a general mortgage until the suits now pending in Washington and Barren counties are decided.

Flint & Pere Marquette.

The Governor of Michigan, accompanied by Railroad Commissioner Cobb and several others, last week made the formal inspection of the last completed section from Reed City to Ludington, 45 miles, preparatory to granting the necessary certificate for the land grant.

ANNUAL REPORTS.

Terre Haute & Indianapolis.

This company owns a main line from Indianapolis, Ind., westward through Terre Haute to the Illinois line, 79.70 miles, and 32.93 miles of short coal branches, making 112.63 miles in all. There are 34.20 miles of sidings on the main line. During the year 5.43 miles of new track were laid, of which 3.33 miles were coal branches and 2.10 miles sidings on main line. The company also works under lease the St. Louis, Vandalia & Terre Haute road, which is an extension of its own line from the Illinois line to East. St. Louis, 158.30 miles. On this line there are 24.33 miles of sidings, of which 4,346 feet were built during the year. The accounts of the leased line are kept separately and the rental paid is 30 per cent. of the gross earnings.

The repairs of the main line required during the year one mile of steel, 10¼ miles of re-rolled iron and 44,588 new ties; on the coal branches and sidings 5¼ miles of iron and 4,567 ties were used. The coal branches are not in good condition, and will need much repair during the current year. The bridges and buildings are in good condition. On the Vandalia road 106 tons of steel, 13.17 miles of re-rolled iron and 79,579 new ties were used in repairs. The grade at Vandalia was partly cut down, and the steam-shovel was then put at work filling up the Big Creek trestle. Of pile bridging 1,087 feet were renewed.

The equipment of the whole line consists of 72 engines; 33 passenger and 22 baggage and express cars; 175 stock, 540 box, 8 lime, 785 coal flat, 119 coal dump, 164 flat and 33 caboose cars; one directors' car, 84 platform work, 2 wreck and 1 crane car. During the year 56 coal dump and five coal flat cars were bought, seven work and one freight flat built and one rebuilt, and 65 cars were broken up.

The balance sheet at the close of the last two fiscal years was as follows:

	1874.	1873.
Capital stock	$1,988,150 00	$1,988,150 00
Bonded debt	1,600,000 00	1,316,000 00
Bills payable	64,852 00	250,160 39
Open accounts, December dividend, etc.	294,756 79	353,876 31
Surplus	1,203,139 27	1,205,753 15
Totals	$5,150,898 06	$5,113,939 85

The capital stock is $17,652, and the bonded debt $14,206 per mile owned. The assets include $522,900 stock of the company $426,700 stock and $202,800 bonds of the Vandalia road and $176,279 stock and bonds of other companies.

The St. Louis, Vandalia & Terre Haute company has $1,281,700 preferred and $2,378,458 common stock, and a bonded debt of $5,499,000, the annual interest on which is $384,930. The bonded debt is $34,732 per mile.

The earnings of the Terre Haute & Indianapolis road and branches for the year ending November 30 were as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Freight	$465,697 03	$505,547 36	Dec.. $39,850 33	7.9
Coal	252,019 56	297,652 06	Dec... 45,632 50	15.3
Passengers	284,836 65	272,844 72	Inc... 11,991 93	4.4
Express, mails, etc.	38,124 86	31,214 32	Inc... 6,910 54	22.1
Total earnings	$1,040,678 10	$1,107,258 46	Dec.. $66,580 36	6.0
Conducting transportation	186,319 04	216,583 64	Dec... 30,264 60	13.9
Motive power	196,478 97	255,119 63	Dec... 58,640 66	22.9
Maintenance of way	152,554 17	210,517 00	Dec... 57,962 83	27.5
Maintenance of cars	66,485 03	86,233 13	Dec... 19,748 10	22.9
General expenses and taxes	58,820 27	56,622 09	Inc... 2,198 18	3.9
Total expenses	$660,657 48	$825,075 49	Dec.. $164,418 01	19.9
Net earnings	$380,020 62	$282,182 97	Inc.. $97,837 65	34.7
Gross earnings per mile	9,239 79	10,158 00	Dec... 918 21	9.0
Net earnings per mile	3,374 06	2,589 00	Inc... 785 06	30.3
Per cent. of expn's.	63.48	71.60	Dec... 8.12	11.3

The work done was as follows:

	1874.	1873.	Inc. or Dec.	P.c.
Train mileage	804,360	860,344	Dec.. 55,984	6.5
Cost of engine service per 100 miles	$22.34	$27.21	Dec.. $4.87	17.9
Through pass. mileage	6,062,625	5,470,985	Inc.. 591,640	10.8
Way " "	2,742,708	2,656,500	Inc.. 86,208	3.2
Total pass'ger mileage.	8,805,333	8,127,485	Inc.. 677,848	8.3
Tonnage mileage, thro' freight	26,606,713	22,024,789	Inc..4,581,924	20.8
Tonnage mileage, way freight	14,441,539	17,817,114	Dec..3,375,575	18.9
Tonnage mileage, total.	41,048,252	39,841,903	Inc..1,206,349	3.0

The earnings and expenses per train mile and per unit of traffic were as follows:

	Earnings.	Expenses.	Net earnings.
Per passenger train mile	$1.5113	$0.8240	$0.6873
Per passenger per mile	3.23 cts.	1.95 cts.	1.28 cts.
Per ton per mile	1.96 "	1.11 "	0.85 "

There was a reduction from 1873 of 0.24 cents in the rate and of 0.42 cents in the cost per ton per mile.

The earnings of the St. Louis, Vandalia & Terre Haute road for the year were as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Freight	$581,211 76	$619,589 13	Dec.$38,377 37	6.2
Coal	67,370 47	115,696 39	Dec..48,325 92	41.7
Passengers	348,304 13	333,884 62	Inc ..14,419 51	4.3
Mail and express	62,354 98	63,252 51	Dec.. 897 53	1.4
Total earnings	$1,059,241 34	$1,132,422 65	Dec.$73,181 31	6.5
Conducting transportation	225,730 66	260,806 52	Dec..35,075 86	13.4
Motive power	201,026 08	210,484 72	Dec.. 9,458 64	4.5
Maintenance of way	273,533 16	254,709 13	Inc...18,824 03	7.4
Maintenance of cars	46,501 86	58,464 98	Dec..11,963 12	20.4
General expenses	33,239 68	22,807 36	Inc...10,432 32	45.7
Total expenses.	$780,031 44	$807,272 71	Dec.$27,241 27	3.4
Net earnings	$279,209 90	$325,149 94	Dec.$45,940 04	14.1
Rental	317,772 40	339,726 79	Dec..21,954 39	6.2
Loss	$38,562 50	$14,576 85	Inc.$23,985 65	164.5
Gross earnings per mile	6,691 35	7,144 00	Dec.. 452 65	6.3
Net earn'gs per mile.	1,763 80	2,051 00	Dec.. 287 20	14.0
Per cent.of expenses.	73.64	73.10	Inc... 0.54	0.7

The increase in maintenance of way expenses was caused by the increased renewal of bridges, and the work of cutting down the grade at Vandalia and filling the trestle at Big Creek, the latter being more properly chargeable to construction.

The work done was as follows:

	1874.	1873.	Inc. or Dec.	P.c.
Train mileage	864,294	878,905	Dec.. 14,611	1.6
Cost of engine service per 100 miles	$22 93	$22 39	Inc.. $0 54	0.2
Through passenger mileage.	7,037,162	7,412,333	Dec.. 375,171	5.1
Way " "	4,573,524	4,269,320	Inc.. 311,204	7.3
Total " "	11,610,686	11,674,653	Dec.. 63,967	0.5
Tonnage mileage, through freight	26,651,914	25,629,850	Inc..1,022,064	4.0
Tonnage mileage, way freig't.	13,733,882	13,091,618	Inc.. 642,264	4.9
" " total	40,385,796	38,721,468	Inc..1,664,328	4.3

The average receipts per ton per mile were as follows:

	1874.	1873.	Inc. or Dec.	P. c.
Receipts	1.60 cents.	1.89 cents.	Dec..0.29 cents.	15.3
Cost	1.02 "	1.18 "	Dec..0.16 "	13.6
Net receipts	0.58 cents.	0.71 cents.	Dec..0.13 cents.	18.3

Trains have been run throughout the year with much regularity and with the usual freedom from accidents.

MASTER CAR BUILDERS' ASSOCIATION.

Ninth Annual Convention.

We continue our summary of the committee reports presented at this convention in New York last week:

REPORT ON HOT JOURNALS AND THEIR TREATMENT—BEST METAL FOR BEARINGS—BEST OILS AND PACKING MATERIAL.

The committee, consisting of J. W. Holmes, Atlantic & Great Western; J. D. McIlwain, Houston & Texas Central, and A. Steinbrunner, Cleveland & Pittsburgh, reported that they had received a number of answers to their questions. They find the causes of hot journals to be various; imperfectly fitted journals, poor oil, overloading, waste settling away from journals owing to the jar of the wheels, jamming waste into the boxes without withdrawing the old charge until it becomes so hard and full of dirt that it will not feed oil to the journal; neglect to attend to boxes, especially at points where cars are interchanged; journals too small for the load, trucks out of line or wheels of different sizes on the same axle. Many remedies are used, most of them, however, only temporary.

As to the material for packing and lubrication, the committee believe, from the information gathered and from experience, that wool waste or long cotton waste for packing, with an animal oil, or a manufactured oil in which animal oil predominates, are the best under all circumstances. Notes are given of some experiments made by Mr. Wadlie, of the Illinois Central, with Mecca oil and the best lard oil. A very small fraction more of the lard oil than the Mecca was used in doing the same work, but the bearings on which the Mecca was used lost a fraction the most in weight, showing greater friction and consequent use of power.

As to the best material for bearings the answers show much difference of opinion. Little is said about the form of bearing, whether center or flat. The committee believe that each has its faults. In the center or ball bearing, the brass should be strong enough to resist the tendency to spring, from which cause journals are often worn concave and when new brasses are put in are sure to heat, until the new bearing is worn to a proper shape. A center bearing will adjust itself when the pedestals are not plumb or the wheels are of different sizes, but there may be more waste of material than with a flat-top bearing, which can be used with success when the wheels are of equal diameter, the journals the same size and the trucks in line. The committee give no decision on this question, but believe that large journals, good material, good workmanship and eternal vigilance will obviate all trouble.

The committee do not recommend any particular lubricator, and conclude by urging the great importance of the subject and recommending that it be continued another year.

MILEAGE OF IRON AND STEEL CAR WHEELS.

The following table of the mileage of iron car wheels worn out and removed on the Boston & Albany road was submitted by Mr. W. E. Chamberlain of that road:

Name of maker.	No. of wheels taken out.	Total miles run.	Least No. of miles run by any one wheel.	Greatest No. of miles run by any wheel.	Average miles per wheel.
A	824	32,764,167	9,432	80,447	39,762
B	593	19,959,526	3,224	97,324	33,659
C	312	8,714,337	3,003	82,368	27,931
D	270	8,148,877	7,963	76,329	30,181
E	108	3,376,480	10,062	73,710	31,264
F	80	1,307,928	1,360	45,630	16,349
G	6	48,728	5,577	9,305	8,121
H	6	141,034	13,728	37,484	23,506
I	5	68,081	11,437	15,740	13,616
Total	2,204	74,529,158	.....	.....	33,815

The mileage of 102 steel wheels found defective and removed was as follows:

No. of wheels.	Total mileage.	Least mileage.	Greatest mileage.	Average mileage.
102	10,538,591	9,300	251,416	103,321

The mileage is also given for 138 pairs of steel wheels still in service, of which the least service of any pair has been 64,094 miles and the greatest, 228,113 miles. Of six pairs which have been turned, the highest run before turning was 174,330 miles; lowest, 62,894 miles. The highest run after turning has been 84,362 miles; lowest, 49,550 miles; highest total, 237,434 miles; lowest, 129,048. Two pairs of wheels which have been turned twice gave the following results:

	Mileage before turning.	After first turning.	Since second turning.	Total
First pair	134,992	192,354	50,268	377,614
Second pair	134,992	180,467	50,620	366,079

REPORT ON SIZE AND FRAMING OF CARS.

This committee, consisting of Messrs. W. R. Davenport, E. A. Olmstead and H. A. Webster, report that they have received 12 tracings of car frames, and have received answers to their circulars from 18 members. From these it appears that a majority are opposed to the use of box cars over 30 feet long, except for some special traffic, such as cotton or lumber. A majority, however, think that there are no objections to the use of a car to carry fifteen tons on eight wheels; most of them think such a car must weigh at least 18,000 or 20,000 pounds. As to the possibility of establishing a national standard freight car, there is much difference of opinion, most of the opposition, however, coming from roads whose business is mainly local.

The committee recommend as a standard a box car 29 feet long for ordinary traffic and 34 feet for hay, lumber, etc., both sizes to have a capacity of 15 tons. The tests of the various models of side frames exhibited at the Association rooms in March excited much interest, but the committee regret that the difference in strength between cars sided lengthwise and sided vertically was not brought out.

Little information was obtained as to framing of passenger cars.

REPORT OF COMMITTEE ON BRAKES.

This committee, consisting of B. S. Ramsey, Pennsylvania; G. W. Demarest, Northern Central, and George Hackett, Central of New Jersey, reported that but little information had been gathered during the year. Few or no comparative tests had been had, partly for the reason that the vacuum brake patent had passed into the hands of the Westinghouse Company, and active rivalry between them had ceased. No official information had been received from the Loughridge Brake Company. The committee recommend the use of the automatic brake, which can be worked or started from the train as well as the engine; they believe that the adoption of a continuous brake on freight as well as passenger trains is only a question of time. No circulars were sent out, as little new information could be expected, and it was believed that more information could be gained by a discussion at the meeting.

REPORT ON FREIGHT-CAR TRUCKS AND BEST POSITION AND HANGING OF BRAKES.

This committee, consisting of Messrs. D. Holt, New York Central & Hudson River, John Kirby, Lake Shore & Michigan Southern, and W. F. Smith, Cleveland, Columbus, Cincinnati & Indianapolis, reported that they had received answers to circulars from 15 roads; from these and their own experience they had come to the following conclusions:

They believe iron trucks to be the best, and had found no trouble in keeping the frames square without extra bracing, when they were of proper size and design. Swinging bolsters are of great advantage, both in economizing power used in hauling and the wear of track and cars. A freight car truck should be as near center-bearing as possible; the side-bearings should be flat, smooth and of hard material, as chilled cast-iron or steel. Where the style of truck will admit, it is better to have a spring in the jaw over the box, but it is not absolutely necessary. A proper distance between centers of wheels in a truck is five feet.

As to putting brakes on both trucks of a freight car there is a difference of opinion, part of the committee considering one truck enough, while the rest think that the additional cost of the brakes on the second truck is saved in the wear on the wheels and the easier stopping of trains. Brakes hung outside of the wheels are believed to be more effective, and can certainly be more easily repaired than those hung between the wheels. With a proper arrangement and proportion of parts, it makes little difference whether brakes are hung from the truck or the body of the car. The best position for the brake staff is upon the left-hand corner as one stands facing the car.

To have a standard truck, duplicate in all its parts (except wheels and springs), would be of very great advantage, especially to through lines over which pass many foreign cars.

REPORT ON SUBJECTS OF DISCUSSION FOR THE NEXT MEETING.

The committee, consisting of W. W. Wilcox, M. N. Forney and W. E. Chamberlain, reported that four subjects were already provided, as the Convention had continued the committees on Heating, Lighting and Ventilating Passenger Cars; on the Best Remedy for Hot Journals, and on Draw Bars and Buffers, and had ordered the appointment of a committee on a System of Accounts for Car Repair Shops. In addition they recommended that the Convention continue the present or appoint new committees on the Best Style and Most Economical Truck for Freight Cars, the Framing of Cars, and on Car Wheels. They also recommended the appointment of a committee "To describe and report on all improvements made in the design, construction or material used for cars during the coming year."

REPORT OF COMMITTEE ON DRAW-BARS AND BUFFERS.

This committee, consisting of F. D. Adams, Boston & Albany; L. Garey, New York Central & Hudson River, and C. A. Smith, late Erie Railway, reported that they had not been able to settle upon any plan satisfactory to themselves to remedy existing evils. The expense to companies of the present system in links and pins alone is very large, and in addition a large sum has to be paid yearly in damages for injuries, wages to disabled men and in some cases pensions to those who have lost a limb. The committee desired to call attention to the defective arrangement of draw-bars in many cases, they being below the line of resistance, giving a leverage over the already weak fastenings. This should be changed so as to bring the draw-bar in the line of most effective resistance. They also believed that a stronger spring should be used, lessening the shock. This spring should have more range of motion than at present. The committee have examined a great number of patent devices, but have found none that meet the exigencies of the case. While not prepared to recommend any definite change of plan, there are certain general principles that may be laid down. The draw-bar should be a self-coupler, without links or pins; the buffing arrangement should be very strong and placed in the line of most effective resistance; and lastly, it must be so arranged as to be used in connection with the present draw-bars.

The committee recommend a full discussion, but no definite action until further light can be had.

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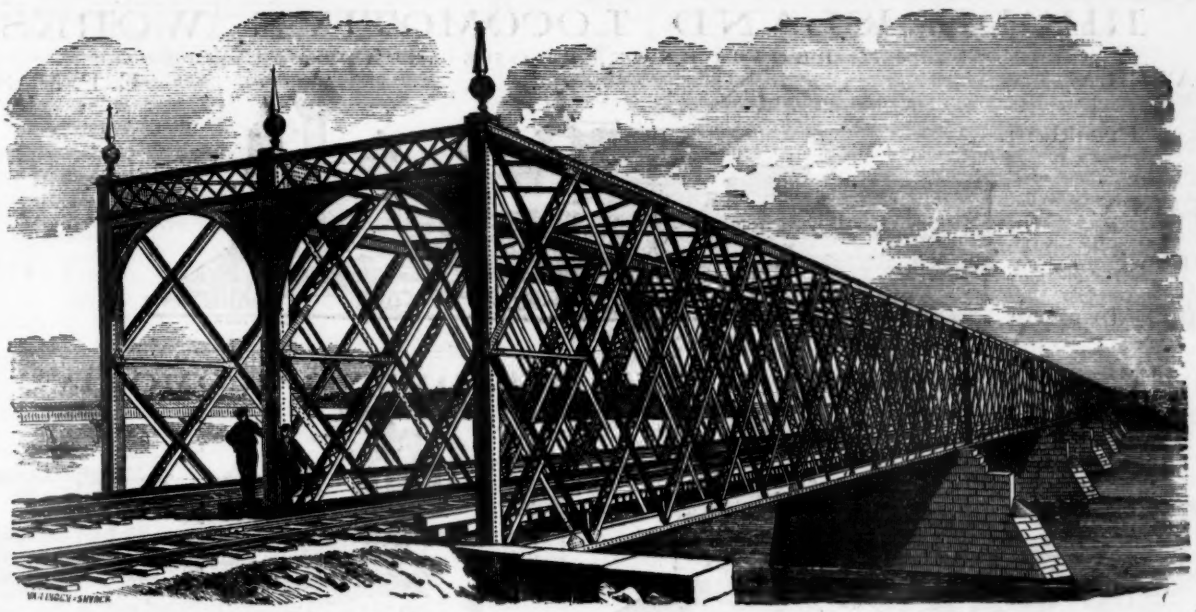

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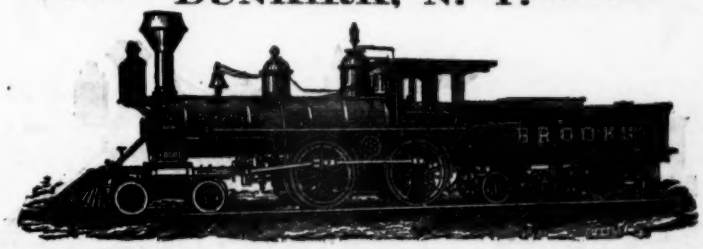

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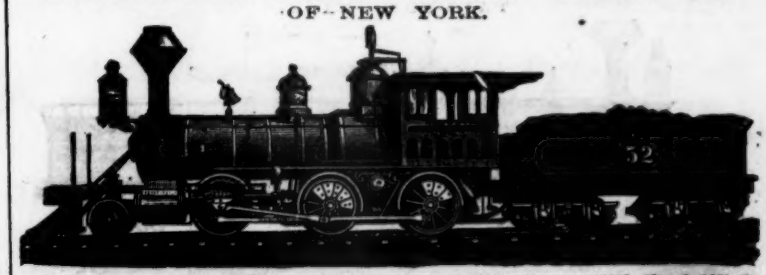

Proprietors of the following Letters Patent granted to Levi Bissell, Aug. 4, 1857, Nov. 2, 1858 (extended Nov. 2, 1872); A. W. Smith, Feb. 11, 1862; D. B. Pratt, Oct. 16, 1860; W. S. Hudson, April 8, 1864 and May 10, 1864.

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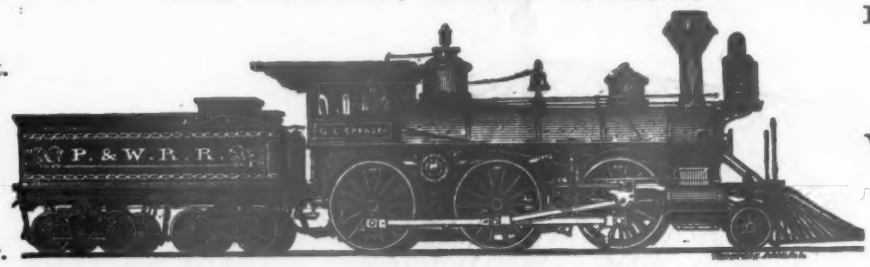

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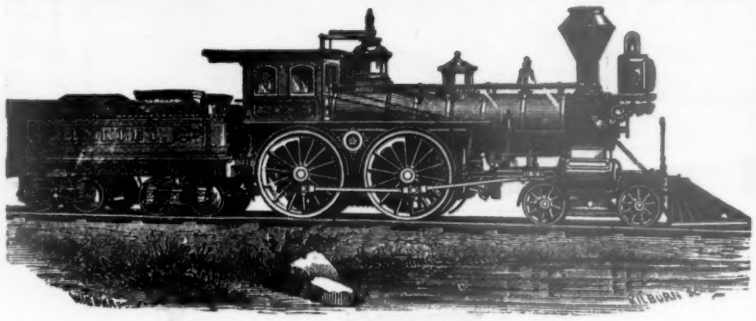

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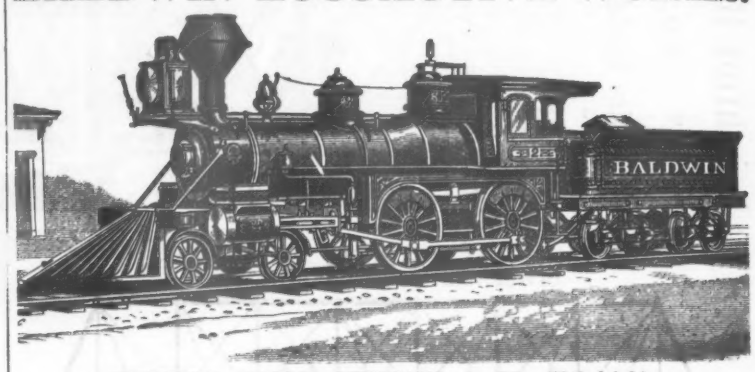

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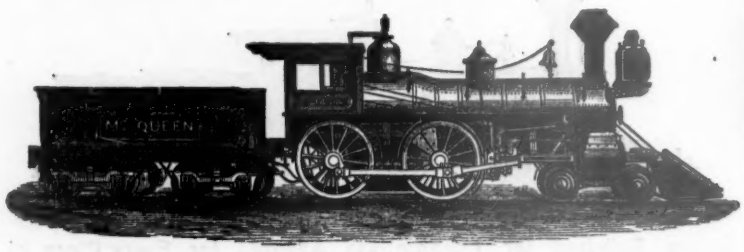

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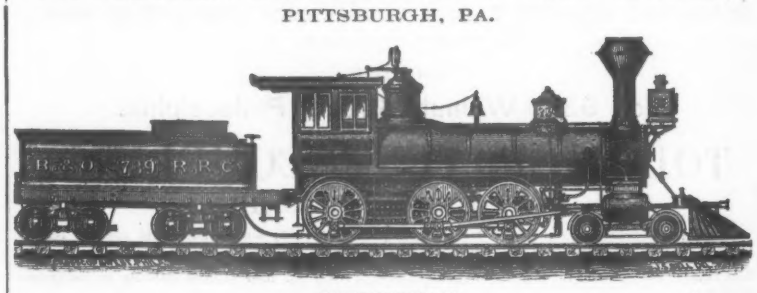

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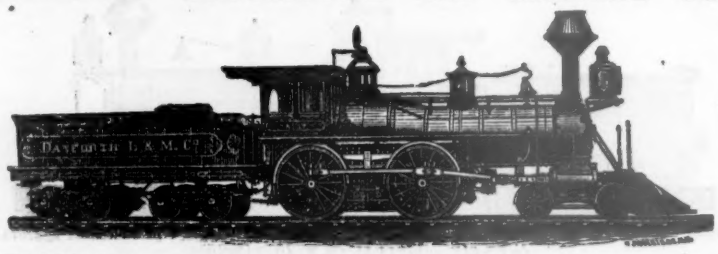

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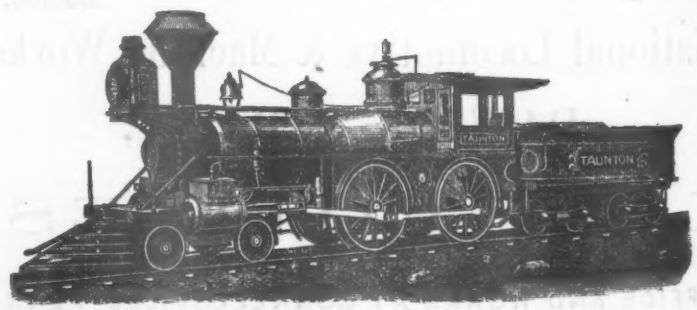

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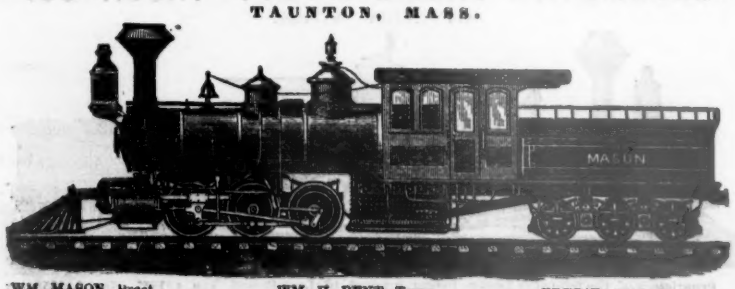

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